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ABSTRACT

This monograph discusses the concept of an effective sports accident data system, various systems in existence at the state and national levels, and basic considerations for the development of such data systems in sports. The document is divided into six chapters providing a framework for investigating the "state of the art" of accident data systems. Chapter One, the introduction, presents a broad outline for the development of an effective reporting system, and the need for initiating this process. Chapter Two discusses national general data systems that include information on sports accidents, and Chapter Three investigates similar systems existing at the state level. Chapter Four surveys selected accident data systems specifically dealing with sports, including the National Athletic Injury Reporting System, annual surveys of football injuries, accident data available through statewide insurance benefit plans, and examples of specialized accident data studies for selected sports. Chapter Five examines basic considerations for developing accident data systems in sports including the following processes: organization, reporting, investigation, data summarization, and data analysis. Chapter six summarizes the value to be gained from instituting an effective accident data system. A bibliography of ninety-nine citations is appended. (MJB)

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Sports Safety Series — **Monograph #2**

2

Accident Surveillance Systems for Sports

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Sports Safety Series
Monograph #2

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FOREWORD

This second monograph comprises a somewhat different format than the other publications in the Sports Safety Series. It was written by one author because of the need to provide continuity in the overall treatment of accident data systems for sports.

In the original text, *Sports Safety*, currently being revised in the form of this Sports Safety Series, accident investigation and reporting was treated in a single chapter. The increased information available because of the recently established data collection systems necessitated a much more involved treatment of this topic. The co-editors also desired to include sufficient detail to enable individuals and/or organizations to make a decision as to whether it would be better to subscribe to a system which already exists or to develop a system more suitable to the local needs. Thus, a complete monograph has been devoted to this important area.

The first monograph of this Series was titled, *Administration and Supervision for Safety in Sports*. This second monograph dealing with accident surveillance systems will be followed by four additional monographs concerned with safety in specific sport and recreational activities. Monograph #3 will deal with the safety aspects of team sports, Monograph #4 with the safety concerns of individual sports, Monograph #5 with aquatic activities and safety, and Monograph #6 with safety for outdoor recreational activities.

These monographs may be purchased as single publications from the AAHPER, or when all six are in print, a combined volume which includes all six monographs will be available at a substantial reduction in the cost of volumes purchased individually.

Joseph Borozne
Chauncey A. Morehouse
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Co-editors
Sports Safety Series

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INTRODUCTORY GLOSSARY

Numerous terms and definitions are presented throughout this monograph when appropriate for meaningful discussion. Selected ones, which are basic to reader orientation in the beginning, are identified and defined as follows:

Sports include, but are not limited to, physically demanding activities, predominantly of a competitive nature, engaged in by one or more persons, indoors or outdoors, for purposes of free or organized participation conducted by a central authority. These activities may be performed on or in buildings, surfaces, areas, or vehicle facilities, on land, in the air, or on, under, or in the water, including water craft and ships.

An accident is any unexpected or unforeseen deviation from the normal happenings in a sport activity which results in an abnormal interruption of the ongoing sport activity that results in injury or damage to actively involved participants, leaders, spectators or frequenters, sports or other products, or other environmental elements.

Injury is an act or incidence which damages, impairs, hurts, or harms a person.

Hazard is a situation or condition that is likely to contribute to an accident event if it is allowed to continue without correction.

Prevention is a calculated precautionary measure or action to forestall or counteract accident producing episodes.

Behavior is the manner in which a person conducts himself and his course of action, during a sport activity or event, toward other people, products, or enivronment.

An *accident data system* is an organized scheme which systematically produces accident data and information from which efficient and objective decisions can be made to prevent accident occurrence or minimize the consequences of accident events.

Reliability is the degree to which accident reporting and records depict facts, information and behaviors consistently and uniformly.

Risk is a hazard or chance of exposure to loss; uncertain or dangerous chances; degree of possibility or likelihood of injury or other damage.

Safety Coordinator is the person in an agency officially designated by higher authority to be responsible for coordination and leadership in planning and developing a total safety program.

Agency is the authoritative body which has official final responsibility for the conduct of one or more sport activities.

State Education Agency is a state level body which by State constitution or statutory enactment has been assigned primary responsibility for education in the schools.

A *system* is a planned orderly arrangement of elements which are interrelated and which act or interact in an interrelated manner during the performance of a sports task or the conduct of some function in a particular sport activity, event, or environment.

Chapter 1

INTRODUCTION

The overall benefits of a sport over time predominantly depend upon the extent and effectiveness of efforts to prevent and control injuries and other accidental mishaps. A critical ingredient for successful demonstration of these efforts is an *effective* accident data system.* Such a system will lead to the systematic collection of valid and reliable data and material evidence which, if utilized properly, can eliminate most potential accident hazards and minimize the consequences of mishaps which do occur.

An effective system is capable of producing appropriate evidence about human, product, and environmental variables for each potential or actual accident episode. Such a system also insures systematic implementation of needed corrective measures and follow up evaluation of effectiveness. The development of an effective system involves several processes which include:

1. Expedient uniform recording on standard forms of all near-miss incidences which indicate potentially hazardous situations or conditions,
2. Expedient uniform recording on standard forms of all accidents which occur,
3. Prompt and thorough investigation of both near-miss and actual accident episodes,
4. A process for summarizing and analyzing accident data,
5. Conclusions and recommendations which provide interpretive directions for corrective actions, and
6. An accountable scheme for assessing and monitoring the corrective measures which are implemented.

The "state of the art" of accident data systems for general or specific surveillance of accident incidence, including sports, leaves much to be desired. None of the systems, at local, state or national levels, maintain a balanced focus required for an effective system as described. However, even though current systems vary widely in scope, purpose and procedures, there are common threads of emphasis. For example, practically all the systems are designed to focus upon after-the-incidence events. Priority attention is focused upon accidental injuries requiring medical attention, and which result in observable restricted activity or specific "lost time" from a particular sports activity. System limitations of this nature reduces significantly the capabilities for obtaining a complete accounting of all accident experiences. Accident episodes, no matter how minor, need to be known even if no personal injury occurred because each incident is an indication that something needs corrective attention. Therefore, each one needs to be studied carefully in search for clues to guide remedial actions and prevent recurrence of the behaviors or conditions which could have more serious consequences. Even though current systems have serious limitations, the accident data derived from them, if effectively analyzed and used, can contribute significantly toward the elimination or minimization of potential and actual accident events in sports activities.

The need for more effective accident data systems becomes increasingly more critical for several reasons. The data base which can be provided by such systems is the only objective

*"Accident data system" and "system" are used synonymously throughout this monograph.

means for obtaining the evidence needed for decision-makers to implement corrective measures and appraise their effectiveness. Furthermore, effective systems are needed to account for particular features inherent in sports activities such as:

1. Certain unique risks and potential hazards which are associated with each sport activity,
2. Competitive behaviors common to all sports in varying degrees of aggressiveness,
3. The dynamics of risk-taking desires or needs possessed to some extent by all sports participants,
4. Personal variables of participants such as their interest, motivation, skill, maturity, and knowledge,
5. Societal influences which affect participants' (and their leaders) behavior and performances in sport activities,
6. Inadequate and overcrowded sport areas and facilities,
7. Discrepancies and failures of sports products and especially personal protective supplies, devices and clothing, and
8. Laxity of officials in enforcing the rules and regulations designed to safeguard participants.

Without effective systems, the accident problem areas associated with each of the items listed above cannot expediently nor precisely be resolved.

Effective accident data systems are also needed so that more accountable protection and guidance can be provided for the increasing populations which participate in a host of traditional sport activities. Thus far, none of these sports have had the advantage of data-based directions which could have been provided by an effective system. A few sports such as football, hockey, and skiing have benefited from specialized systems from which limited evidence was derived and used in controlling several accident-producing hazards. However, the list of traditional sports that need more valid and reliable data to guide prevention and control efforts is long.

A similar need for more effective systems exists in the newer developing sports which are numerous and varied. The number of participants in these sports range from hundreds to millions and continue to increase dramatically as does the accident toll. These sports, for example, include snowmobiling, skin and scuba diving, water skiing, sky gliding and parachuting, backpacking, and a host of others. If the trend of new sports developments continues, several more will be introduced in the next few years.

Chapter 2

NATIONAL GENERAL SYSTEMS WHICH INCLUDE SPORTS ACCIDENT DATA

The concept of an effective sports accident data system and the processes involved have been previously described. While few, if any, exist, such a system is attainable, and vigorous efforts by sports leaders should be exerted toward that end. Meanwhile, direction and concentration of effort should be upon establishing the best system possible where none exists and upon improvement of the ones already in operation. It is through these "real world" experiences that the technology and competencies required to develop an effective system will be realized.

A basic step in this direction is to make full use of existing general systems where available. There are several which can make unique and significant contributions to an accident data base for sports. A selected sample of these systems are reviewed in this chapter.

The National Safety Council System

Accident reporting guidelines and materials designed for use in educational institutions have been provided by the National Safety Council for many years. The system can be used as prescribed or adopted for local developments.

Elementary and Secondary Schools. Selected aspects of the Council's system for elementary and secondary schools are provided to familiarize readers with the general features of the system and its capabilities with regard to sports accident data.

The forms developed for elementary and secondary schools within the system include a) a standard student accident report form, b) monthly student accident summary forms (for boys and girls), and c) annual student accident summary forms (for boys and girls).

The Standard Student Accident Report Form is used for recording the details of student accidents and injuries. As can be noted in Figure 1, the form is applicable for all accidents, including those which occur in sports.

Detailed instructions are provided on the back of the form to guide recorders in completing it. The need for complete reporting and precise recording of precise information is emphasized.

An integral part of the reporting form and instruction information is the code sheet which gives a breakdown of general and specific classifications of accident details. Reporters need the code sheet to properly fill out the report form. Selected general coding classifications are provided as part of the system and are applicable to sport accidents.

These coding items are a key link in acquiring valid and reliable accident data though limited, of course, to the purpose and objectives of the system's design for elementary and secondary schools.

(check one)
☐ School Jurisdictional
☐ Non-School Jurisdictional

RECOMMENDED STANDARD STUDENT ACCIDENT REPORT

(See instructions on reverse side)

(check one)
Recordable ☐
Reportable Only ☐

School District:
City, State:

General

1. Name		2. Address	
3. School	4. Sex: Male ☐ Female ☐	5. Age	6. Grade/Special Program
7. Time Accident Occurred — Date:	Day of Week:	Exact Time:	AM ☐ PM ☐

Injury

8. Nature of Injury

9. Part of Body Injured

10. Degree of Injury (check one)
Death ☐ Permanent ☐ Temporary (lost time) ☐ Non-Disabling (no lost time) ☐

11. Days Lost
From School: From Activities Other Than School: Total:

12. Cause of Injury

Accident

13. Accident Jurisdiction (check one)
School: Grounds ☐ Building ☐ To and From ☐ Other Activities Not on School Property ☐
Non-School: Home ☐ Other ☐

14. Location of Accident (be specific)	15. Activity of Person (be specific)
16. Status of Activity	17. Supervision (if yes, give title & name of supervisor) Yes ☐ No ☐
18. Agency Involved	19. Unsafe Act
20. Unsafe Mechanical/Physical Condition	21. Unsafe Personal Factor

22. Corrective Action Taken or Recommended

23. Property Damage
School $ Non-School $ Total $

24. Description (Give a word picture of the accident, explaining who, what, when, why and how)

Signature

25. Date of Report	26. Report Prepared by (signature & title)
27. Principal's Signature	

This form is recommended for securing data for accident prevention and safety education. School districts may reproduce this form adding space for optional data. Reference: *Student Accident Reporting Guidebook*, National Safety Council, 425 N. Michigan Avenue, Chicago, Illinois 60611. 1966. 34 pages.

Figure 1: Recommended Standard Student Accident Report Form

In the development of this system the critical problem of determining what is to be a reportable accident was encountered. A commentary regarding how this problem was resolved is quoted as follows:

"The purpose of distinguishing between types and severity of accidents is twofold: first, to provide the school with information relative to all school jurisdiction accidents and with non-school jurisdiction accidents causing injury to pupils; and second, to provide a standard method with a common base in order to compare and analyze accident and injury data within a school system, or with other school systems, or with national statistics. The terms used to distinguish these purposes are reportable (any accident for which a report is filled out) and recordable (any accident to be included in standardized statistical treatment of the data)." (53:7)

In this system reportable and recordable accidents are considered a critical feature. The emphasis is that every school system should require a report of some kind, defined as reportable. The rationale is that school authorities need to know of all accidents which occur in activities or events sponsored under school jurisdiction, primarily because preventive and control measures can be formulated only when the details of an accident are precisely known. Especially pertinent is whether the incident, or the hazard, is under the jurisdiction of the school. Such information, if known, provides some protection for school personnel should liability become an issue.

In this system an investigation of all recordable accidents is suggested. The investigation reports are submitted on the standard student accident report forms and sent to the safety program administrator or coordinator. (53:9)

The *Student Accident Summary Forms* (for boys and girls) are used for preparing monthly summaries of recordable accidents as reported on the *Standard Student Accident Forms*. Thus, the more important information and facts to be observed and used primarily for decision making purposes are summarized.

These summaries are of proven diagnostic value in determining status and trends of accident occurrence. Also, evidence of critical safety problems can be identified and action taken on a regular short term basis. The tabulation and analysis of data obtained for summary purposes can be done manually or by machine.

Machine data processing should be given a top priority in analyzing and summarizing data derived from this system if the volume of reports warrants it. The amount and type of data which can be obtained by this means is practically unlimited and the tasks can be completed in minutes. (53:17) This machine process can provide source materials not normally available from the manual processing method because of staff and time limitations.

To illustrate this system's capabilities for identifying and monitoring sports accident problems, the following description is provided.

Example: The safety coordinator in a large school system was reviewing the monthly summary chart. He noted a disproportionately high number of accidents were occurring in the team sports sponsored under school jurisdiction. The fact became evident from the tabulations recorded for the chart item "activity, by classification of accident." The highest incidence was in varsity football. He then summarized the football accidents by:

a) status of the activity, b) nature of injury and parts of the body injured, c) agency involved, d) unsafe physical condition, e) unsafe act, and f) unsafe personal factor.

In investigating further he found that most of the incidents were broken teeth and mouth damage and that no mouthguards were being used. The problem was discussed with the safety coordinator, coaching staff, physical education teachers, and school administrators. This led to a request for the local dental association to assist in developing corrective measures. An experimental mouthpiece was developed that could be fitted individually for each football player. The chief school administrator approved the funding to purchase mouthguards for participants. The coaches agreed to require all players to wear them, and the safety coordinator

agreed to evaluate the results. During the next football season no tooth damage incidence was reported. (53:14)

The Annual Student Accident Summary Forms are used for annual consolidation of all recordable accidents reported for the year.[1] This data then provides the essential information for calculating the accident frequency rate and the average severity rate by grade level. These rates are valuable for a variety of comparative purposes and are especially beneficial for making direct comparisons with overall rates. (53:17)

The frequency rates relate the number of accidents/injuries to exposure factors. A definitive measure for sports accidents is frequency rates calculated on the basis of "participant (student) hours" rather than "student days". The "participant hour" figure is harder to estimate, but it gives more valid evidence of accident experience. For example, it accounts for the hourly "time a participant spends in a particular sport activity" in relation to the number of injuries in each category. A formula applicable to sports programs is indicated by the following example.

One hundred and twenty participants (students) were enrolled in each of four physical education classes including team sports. Each class met four hours a week for 36 weeks. Two injuries were reported during this period of time.

$$\frac{2 \times 1{,}000{,}000}{120 \times (4 \times 4 \times 36)} = \frac{2{,}000{,}000}{69{,}120} = 28.9$$

(number of recorded injuries per million student hours.) (53:21)

The system administrator can use this formula to compute injury frequency rates on a monthly, semester, or annual basis for all sports in the school system, for one school, by grades, or by activities. He can compare rates on the same basis and determine where improvements are needed. A comparison of annual (or other time periods) frequency rates with previous years is possible for all sports or selected sports in a single or several schools.

Severity gives an indication of the seriousness of injuries for totals of accidents or specific areas or activities such as sports. In addition, results can be compared year by year to determine negative or positive results. Severity information can be obtained: a) generally, such as, total accident experience of a school or school system or b) specifically, such as, total accident experience of an activity or activities such as sports.

A meaningful measure of severity for sports injuries is by use of the severity rate. The concept is similar to that for figuring frequency rates. For example, the severity rate relates severity days to the exposure and expresses the outcome in terms of 100,000,000 participant (student hours) units. The formula for figuring severity rate is:

$$\frac{\text{Number of Severity Days} \times 1{,}000{,}000}{\text{Exposure (average number of participants} \times \text{number of student hour units)}} =$$

Severity Rate (average severity days per 1,000,000 student hour units) (53:23)

This way of figuring severity rates is the most meaningful one for safety and sports personnel. It not only accounts for permanent disabilities and death, but also includes the exposure factor. Severity rates figured this way can be compared to the severity rates of past years to determine status and progress.

Institutions of Higher Learning. A general accident data system designed for institutions of higher learning has also been available during recent years from the National Safety Council. However, the Council's activities in this area will be discontinued when the current supply of materials are expended. This means there will no longer be a national resource organization to

[1] "Reportable only" accidents are not included in the monthly or annual summaries.

assist higher education personnel in establishing and maintaining general systems. This fact plus the paucity of significant system literature reduces the liklihood of effective general systems being developed in most institutions of higher learning. With the exception of a few institutions which maintain a system designed for local use, the future outlook is bleak for improved accountability in reducing accident experience among student populations, in sports and otherwise.

The National Electronic Injury Surveillance System (NEISS)

NEISS is a national accident data system designed to determine the nature and scope of product injuries to consumers. The system is administered through the U.S. Consumer Product Safety Commission which is a regulatory agency of the Federal Government. It has rule-making authority and its policies are set by five Commissioners, who are nominated by the President, confirmed by the Senate, and serve fixed terms. The agency's mission is to reduce the risk of injury among consumers while using consumer products, including those used in competitive and recreational sports. A consumer product is defined as any article manufactured for sale to, or for intended use by consumers in or around the home, at school, in recreation and the like. The primary goal of the Commission is to reduce substantially injuries associated with consumer products.

The Commission has a variety of ways to deal with hazardous products, including those used in sports, depending on the severity of the risk each represents. The authority exists for banning or seizing "imminently hazardous products." If the risk is neither immediate or severe but still considered "unreasonable," mandatory standards can be promulgated that will reduce the injury risk. Where the risk is less, the Commission may rely on voluntary standards and voluntary compliance.

Any defective sport product, which does or could present a substantial hazard to a consumer is required to be reported to the Commission by all manufacturers, distributors, and retailers. The Commission may then order the defective products to be recalled, repaired, replaced, or repurchased by the manufacturer. Also the Commission has authority for conducting research to determine cause and prevention of product-related injuries, including sports, and extensive information gathering authority including access to company records which relate to safety aspects of a product.

A vital part of the information collecting process is NEISS. According to the Commission, this system for surveillance and investigation of product-related injuries is presently the most important epidemiological tool in the field of product safety. (82:1) It is the only statistically valid, national representative system in the world for continuous monitoring of consumer product-related injuries. (80:2) The system's function is based on five concepts explained concisely by Esch as follows:

> First, the system is national in scope. Since it is based on a representative sample of hospital emergency rooms throughout the country, we can for the first time make statistically valid projections to the United States population of the number and types of injuries seen in hospital emergency rooms. Now 119 hospitals are participating in the NEISS program, comprising a representative sample of about 5,000 emergency rooms in the continental U.S. Statistically valid projections of all data categories can, therefore, be made for any given reporting period.
>
> Second, data on all emergency room patients having product-related injuries are transmitted *electronically* from each reporting source to a central computer in Washington, D.C., every 24 hours. This type of reporting has the distinct advantage of insuring that the data is current. It further provides a mechanism for the rapid analysis of information which, in turn, can be the basis for initiating a field investigation.
>
> *Injuries*, defined in this program, are instances of trauma requiring competent medical care or resulting in at least one day of restricted activity. Presently, data that are collected

include injuries related to products used in the household, recreational activities, and in institutional environments. Included are sports injuries and injuries associated with athletic equipment.

Surveillance, as made possible through this program, will provide an unprecedented capability for monitoring injury patterns, as well as isolating specific aspects of the injury problem. Further, an assessment of the effectiveness of remedial programs will be possible through this same hospital network.

The system which is now represented through the hospital surveillance program is the first major segment of a total injury data effort. Plans are being made for utilizing death certificates on a national basis for obtaining product injury information. (23:13-14)

To illustrate more specifically the NEISS concept as it relates to sports safety, Figure 2 provides a schematic diagram of the NEISS process. (80:2)

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM

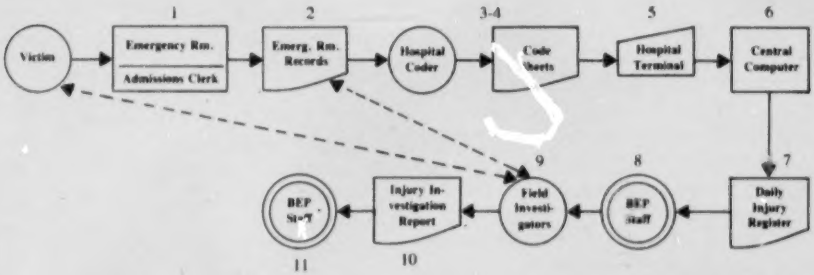


Figure 2: The Path of an Injury Through the NEISS System

Sports Injury Data. The nature and extent of sports injury data available through NEISS is valuable particularly to sports safety professionals who are dedicated to the improvement of sports safety programs. To increase awareness of this group and others who may be interested, selected examples of the system's capabilites are provided. For example, daily computer printouts of injury details of football injuries are illustrated in Figure 3.

Injury data on a number of other sports activities and related equipment are also available through NEISS. Selected examples are shown in Figure 4 which show injury data received for gymnastics, swimming pools water slide, ice hockey and handball.

With data of the type which has been described, estimated frequencies can be determined which will indicate the number of cases reported to hospital emergency rooms nationwide that are associated with a specific product or activity. Summaries can then be compiled to show age groups and accident types as shown in Figure 5.

In addition, a matrix report can be constructed for the product description showing the relative distribution of diagnoses and body parts injured. The matrix model can be adapted to any product-related injury study. To illustrate, a matrix report on basketball is shown in Figure 6, although it does not show the complete list of injury classifications that can apply, it does give a unique pattern of injuries resulting from basketball activity or use of related products.

Another NEISS capability allows totals to be summarized for each product and activity, and listed according to frequency of reports.

In Figure 7 an example is shown under the category of Sports and Recreational Equipment with selected items showing the highest numbers. (23:18)

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)
INJURY DATA DETAIL

RUN DATE 09/04/75

Product Description	Type	SEC PRD	Sex	Age	Cat	Id.No.	Hospital Rec.	Batch Date
Disposition								
1211 Football, Activity and Related Equipment								
5590 Dislocation Lower Arm — Incl Wrist and Elbow								
Treated and Released	0	0	M	15	2	11436006	00020876	08/27/75
					Total Disposition			1
					Total Injury Description			1
5591 Dislocation Lower Leg — Incl Knee and Ankle								
Treated and Released	5	0	M	16	2	11542003	00164000	09/01/75
					Total Disposition			1
					Total Injury Description			1
5592 Dislocation Finger								
Treated and Released	0	0	M	11	2	11255002	00023308	09/02/75
	0	0	M	17	2	11029006	05243146	08/31/75
	0	0	M	16	2	11436008	00000040	08/29/75
					Total Disposition			3
					Total Injury Description			3
5682 Foreign Body Hand								
Treated and Released	0	0	M	05	2	11436008	00000018	08/31/75
					Total Disposition			1
					Total Injury Description			1
5776 Fracture Face — Incl Nose								
Treated and Released	0	0	M	16	5	11436008	00000035	08/28/75
					Total Disposition			1
					Total Injury Description			1
5778 Fracture Upper Trunk								
Treated and Released	5	0	M	16	5	11436008	00000042	08/28/75
	5	0	M	14	5	11436006	00021228	08/31/75
	5	0	M	16	5	11436008	00000043	08/29/75

Figure 3: Sample Page of NEISS Daily Computer Printout on Football Injuries

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)
INJURY DATA DETAIL

RUN DATE 09/04/75

Product Description	Type	SEC PRD	Sex	Age	Cat	Hospital Id.No.	Rec.	Batch Date
Disposition								
1272 Gymnastics and Associated Equipment								
5890 Hematoma								
Lower Arm — Incl Wrist and Elbow								
Treated and Released	5	0	F	17	3	10808004	00008122	08/31/75
					Total Disposition			1
					Total Injury Description			1
5976 Laceration								
Face — Incl Nose								
Treated and Released	0	0	F	05	4	11029004	00048392	08/28/75
					Total Disposition			1
					Total Injury Description			1
					Total Product Description			5
1277 Swimming Pool Water Slides								
5378 Contusions, Abrasions								
Upper Trunk								
Treated and released	5	0	M	11	3	10517010	00014655	09/01/75
					Total Disposition			1
					Total Injury Description			1
					Total Product Description			1
1279 Ice Hockey and Related Equipment								
5793 Fracture								
Toe								
Treated and Released	5	0	M	30	3	10325001	01768282	09/01/75
					Total Disposition			1
					Total Injury Description			1
					Total Product Description			1
1282 Handball								
6692 Strain, Sprain								
Finger								
Treated and Released	5	0	M	23	1	11542001	00854385	08/26/75
					Total Disposition			1
					Total Injury Description			1
					Total Product Description			1

Figure 4: Sample Page from NEISS Daily Computer Printout for Selected Sports

PRODUCT NO. 1211 FOOTBALL

Age	Total	Home	Farm	Occup	Highway	Other	Assault	UN/NS
(UN)	5					4		1
(-2)	6	3				2		1
(2-4)	19	9				3		7
(5-9)	688	221			7	202		258
(10-14)	4490	974	2	1	58	2009	1	1445
(15-19)	5030	710	1	2	71	2759		1487
(20-24)	1365	181	1	1	15	695		472
(25-34)	800	143		1	11	308		337
(35-44)	136	42			3	46		45
(45-54)	36	14				10		12
(55-64)	10	3				2		5
(65+++)	6	3				2		1
Tot. Type	12591	2303	4	5	165	6042	1	4071

INPUT RECORDS 12,591

Figure 5: Sample Chart Showing Number of Cases Reported from Football Injuries, July, 1972, through June, 1973 (23:16)

The Commission has an organized informational and educational campaign in the form of the *NEISS News* which is the primary means of routine distribution of NEISS data. This is a monthly periodical which usually contains short articles on product safety and specific data on more than 100 products or combinations of products. A supplementary means used to disseminate information is through periodic news releases such as "CPSC Offers Football Safety Tips" released to the press in October, 1974.

Contributions of NEISS to Sports Product Standards Development. The role of the C9mmission in the development of standards for sports and other products is primarily of a mandatory nature as prescribed in the Consumer Product Safety Act. The Act, however, provides unique provisions which allows the public first opportunity in standard developments. If there are no offers from the public, or a public effort is unsuccessful, or if a public offer comes from a single agency then the Commission is allowed to write a standard.

The initial phase of the process is a determination by the Commission that a consumer product is an "unreasonable" risk. Since the law does not prescribe precise definitions or rules for distinguishing between reasonable and unreasonable risks, the Commission makes such a judgment based on several factors listed as follows:

1. The number and severity of the accidents involving the product,
2. The contributing role of the product in the accidents,
3. Whether the hazards the product presents can be eliminated by technically feasible actions,
4. What expense would be involved in required modifications,
5. Whether the risk to the user of the product is assumed knowingly or unknowingly — voluntarily or involuntarily,
6. The uniqueness of the function the product serves, and
7. Public exposure to the product.

The use of NEISS surveillance and investigative data is encouraged by the Commission particularly for product performance assessments and modifications and consumer education programs. Examples of agencies or disciplines, which can beneficially use NEISS findings in planning and implementing injury control programs, are manufacturers, education, medicine, and safety and health councils. Additional information concerning NEISS and the operations of the Commission can be obtained by writing to: U.S. Consumer Product Safety Commission, Washington, D.C. 20207.

NEISS MATRIX REPORT

PRODUCT NO. 1205 BASKETBALL, ACTIVITY AND RELATED EQUIPMENT

	Head	Face	Eye	Ear	Mouth	Neck	U/T	U/A	L/A	Hand
Fract	-	130	-	-	8	2	50	2	237	132
	-%	1%	-%	-%	*%	*%	*%	*%	2%	1%
Disl.	-	6	-	-	11	-	69	2	11	4
	-%	*%	-%	-%	*%	-%	1%	*%	*%	*%
ST-SP	-	-	-	-	-	35	150	11	297	119
	-%	-%	-%	-%	-%	*%	1%	*%	2%	1%
Hemat	10	8	7	-	1	-	-	-	7	2
	*%	*%	*%	-%	%	-%	-%	-%	*%	*%
Conc.	42	-	-	-	-	-	-	-	-	-
	*%	-%	-%	-%	-%	-%	-%	-%	-%	-%
I-O-I	-	-	2	1	-	-	1	-	-	-
	-%	-%	*%	%	-%	-%	%	-%	-%	-%
N-DMG	-	-	-	-	-	-	-	-	-	-
	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
E-SHK	-	-	-	-	-	-	-	-	-	-
	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
Subm.	-	-	-	-	-	-	-	-	-	-
	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
Dermat	-	1	15	-	-	-	-	-	-	-
	-%	%	*%	-%	-%	-%	-%	-%	-%	-%
C-DMG	-	-	-	-	-	-	-	-	-	-
	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
Othr.	-	-	-	1	-	-	-	-	-	-
	-%	-%	-%	%	-%	-%	-%	-%	-%	-%
N/S	3	2	-	-	-	-	1	-	2	1
	*%	*%	-%	-%	-%	-%	%	-%	*%	%
Total	316	900	126	19	275	49	461	22	826	466
	3%	7%	1%	*%	2%	*%	4%	*%	7%	4%

- - - - - - - - - AGE - - - - - - - - - -

(-2)	4	*%	(15-19)	4,981	40%	(45-54)	62	*%
(2-4)	23	*%	(20-24)	2,442	20%	(55-64)	13	*%
(5-9)	186	1%	(25-34)	1,778	14%	(65+++)	1	*%
(10-14)	2,551	21%	(35-44)	357	3%	(UNKWN)	4	*%

Figure 6: A Matrix Report on Basketball, Activity, and Related Equipment

Fngr	L/T	U/L	L/L	Foot	Toe	All	25-50	Other	R/S	Total
774	3	2	343	215	69	-	-	1	1	1909
6%	*%	*%	3%	2%	1%	-%	-%	%	%	16%
196	1	1	51	5	2	-	-	-	-	359
2%	%	%	*%	*%	*%	-%	-%	-%	-%	3%
866	91	22	4074	424	26	-	-	-	1	6116
7%	1%	*%	33%	3%	*%	-%	-%	-%	%	49%
11	10	6	24	6	6	-	-	-	-	98
*%	*%	*%	*%	*%	*%	-%	-%	-%	-%	1%
-	-	-	-	-	-	-	-	-	-	42
-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	*%
-	-	-	-	-	-	-	-	-	-	4
-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	*%
-	-	-	-	-	-	-	-	-	-	-
-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
-	-	-	-	-	-	-	-	-	-	-
-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
-	-	-	-	-	-	-	-	-	-	-
-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
-	-	-	-	-	-	-	-	-	-	16
-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	*%
-	-	-	-	-	-	-	-	-	-	-
-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
-	1	-	1	-	-	-	-	-	-	3
-%	%	-%	%	-%	-%	-%	-%	-%	-%	*%
4	1	-	21	2	2	1	1	-	-	40
*%	%	%	*%	*%	*%	%	%	-%	-%	*%
2480	194	53	5174	895	158	1	1	2	5	12403
20%	2%	*%	42%	7%	1%	%	%	*%	*%	100%

- - - - SEX - - - -			- - - DISPOSITION - - - -		
N/S	6	*%	T & R	12,276	99%
MALE	10,729	87%	T & TH	19	*%
FEM.	1,666	13%	HOSP	108	1%
			DOA	--	-%

Product #	Product Description	f	S
P1200	**SPORTS AND RECREATIONAL EQUIPMENT**		
1202	Bicycle and Bicycle Equipment	17,411	33
1211	Football, Activity and Related Equipment	12,591	22
1205	Basketball, Activity and Related Equipment	9,492	16
1204	Baseball, Activity and Related Equipment	8,983	23
1265	Sports Ball, not specified	3,207	18
1241	Swings	2,788	30
1216	Snow Skiing and Associated Equipment	1,887	20
1214	Hockey Equipment	1,640	27
1210	Fishing Equipment	1,569	26
1231	Swimming Pools and Associated Equipment, not including Above-Ground Pools	1,415	79
1245	Ice Skates	1,164	21
1266	Volleyball	1,161	15
1244	Playground Climbing Apparatus	1,094	30
1242	Slides	1,010	34
1263	Mini-Bikes	1,003	34
1267	Soccer	1,000	22
1219	Tennis and Badminton Equipment	918	19
1270	Wrestling — Organized Activity and Related Equipment	756	25
1272	Gymnastics and Associated Equipment	749	22
1212	Golf Equipment except Golf Carts	704	31
1200	Sports and Recreational Equipment	636	25
1233	Trampolines	551	20
1203	Boats, Motors and Accessories for Recreational Use	502	48
1218	Snowmobiles	480	44
1206	Bowling, Activity and Related Equipment	474	16
1237	Gas, Air and Spring Operated Guns	452	38
1262	Swimming Pools, Above-Ground	432	59
1217	Sleds	424	33
1201	Playground Equipment not elsewhere classified	414	26
1209	Exercise Equipment	408	36
1264	Water Skiing and Associated Equipment	359	24
1273	Toboggans	321	34
1268	Track and Field Activities, and Related Equipment	300	23
1230	Camping Trailers, other than Mobile Homes	264	28
1236	Unlicensed Motor Scooters and Go-Karts	248	23
1243	See Saws	226	26

Figure 7: NEISS Frequency Rank of Injuries Related to Sports and Recreational Equipment, July, 1972, through June, 1973.

The National Center for Health Statistics[1]

This Center provides much of the health data for the nation as a whole. The Center's mission is to develop and maintain systems capable of providing reliable, general purpose, national,

[1]The National Center for Health Statistics (hereafter referred to as NCHS) is a component of the Health Resources Administration, Public Health Service, U.S. Department of Health, Education and Welfare.

descriptive health statistics on a continuing basis and to publish these statistics for use of the health industry and related industries, both public and private. (84:4) "Increasingly, NCHS is being looked upon by state and local governments and universities as the focal point for national leadership in the development of coordinated health statistics programs to serve the needs of both public and private programs." (84:3)

In general, the Center's concept of health includes injuries and, within its mission and objectives, injury data are collected and reported regularly, and occasionally special reports on the subject are released. This general information and data are of little practical value to the sports world. The Center does not collect data on sports injuries or accidents, but rather only on place of injury such as recreation areas.[2] Therefore, the activities of the Center are not reviewed in this monograpn due to lack of space.

The Occupational Safety and Health System

A system for recording work-related injuries and illnesses, including those occurring in professional sports, was established by the Occupational Safety and Health Act of 1970. Amateur sports injuries or illnesses are not included because no employment relationship exists. The act provides for a rigorous, accurate set of statistics to bolster standard setting and compliance activities. The OSHA Act directs the secretary of Labor, in consultation with the Secretary of Health, Education and Welfare, to "develop and maintain an effective program of collection, compilation, and analysis of occupational safety and health statistics." The Secretary of Labor has assigned to the Bureau of Labor Statistics the responsibility for this program. (88:14) In many states, a statistical grant agency cooperates with the Bureau in administering the record keeping program. The date of July 1, 1971, marked the beginning for records keeping and reporting under the Act. (89:1)

Due to unique situations which occur in professional sports, some of the record-keeping regulations have been difficult to apply. In certain cases, such as professional football, assistance was requested in applying the record-keeping requirements to the unique situations involved in this professional sport. As a result a letter of guidance was prepared by the Bureau of Labor Statistics and sent to individual teams of both the National and American Football Leagues. One area of guidance in the letter clarifies the concept of lost work days which presents a difficult problem for professional teams. For example, if a players spends time from a practice session treating a bruised ankle in a whirlpool bath, does it count as a "lost work day?" If a player's ability to participate in a practice session is doubtful, the management must decide whether or not the player could participate, in his current condition, in a game situation. If he could, there would not be a lost work day case; if he could not, the case would be recorded as a lost work day of restricted work activity. (12:10-17)

In conclusion, it should be pointed out that this relatively new system has the potential for contributing significantly to improvements in system developments. The system output specifically with regard to sports accident data could no doubt expedite the identification of corrective measures needed to control injuries and other losses in professional sports and others sponsored by employers who are covered by the Act. There is, however, no plan to publish accident data information about individual professional sports or about professional sports as a whole.

Additional information and materials concerning this system are available on request from the regional offices of the Bureau of Labor Statistics, or the Office of Occupational Safety and Health Statistics, Washington, D.C.

[2]Personal communications written by James M. Robey to the author on August 29, 1975.

Chapter 3

GENERAL SYSTEMS OF STATES WHICH INCLUDE SPORTS ACCIDENT DATA

There is not a complete accident data system which encompasses all educational institutions in a particular state. There are, however, a few states in which a statewide accident data system of some type is in operation.

Elementary and Secondary Schools

The state educational agency has normally been the initiator of accident data systems of use by elementary and secondary schools. In a few states the State Board of Health or some other state agency has provided this service for schools. (53:27) Because effective statewide systems can contribute significantly to accountability for surveillance of accident experience in sports, a brief review of selected statewide plans with different approaches and distinguishing features is provided.

The Louisiana Plan. One of the more successful statewide accident data systems has been conducted by the Louisiana State Department of Education since 1967. The system is all inclusive and provides for reporting of accidents which occur to students in both school and non-school jurisdiction categories.

In the early stages of implementation school representatives were reluctant to use the summary forms which both the local school and the local school system were asked to complete. To resolve this problem manual processing of data was changed to machine processing with expectations that more schools would participate in the system. (49:42)

In this plan, schools are requested to submit an accident report on the state form shown in Figure 1. As accidents to students occur, forms are filled out by teachers or other individuals who have been assigned responsibility for that particular area and activity. These reports are forwarded on a monthly basis to the State System Office where assigned personnel check forms for accuracy and completeness and code them according to jurisdiction in the applicable code categories. Then the forms are processed by the Department's data processing section and a summary, broken down according to jurisdiction is returned to the accident data officer. The summary includes a listing of total number of accidents, total injuries and days lost, and a breakdown by category on a statewide basis and according to individual school districts. Each school is then forwarded a summary report of their own accident experience. At the end of each school year the data processing section of the Department sends to the accident data office totals in the categories of accidents, injuries and days lost due to injury and totals for each category. The participating schools also receive this information.

This plan focuses on a comprehensive method of analyzing all school areas in which accidents most frequently occur and the types of activities in which most severe accidents occur. Also, provisions are made to account for sports accidents in interscholastic athletics, physical education, and recreational activities for both school jurisdication and non-jurisdiction events.

The basic problem in this system is the typical one of reporters' failures to fill out the form

STATE OF LOUISIANA
DEPARTMENT OF EDUCATION
BATON ROUGE, LOUISIANA

STUDENT ACCIDENT REPORT
1819

Jurisdictional Classification of Accident
☐ School ☐ Non-School

1. DATE OF ACCIDENT	2. TIME	4. PUPIL'S NAME	6. SEX	7. AGE	8. GRADE	9. NO. OF DAYS LOST
3. SCHOOL		5. PUPIL'S ADDRESS				

INSTRUCTIONS FOR CLASSIFICATION: Please refer to lists of each category on back of page and list only the code number in the appropriate square. If other, please state.

	CODE	OTHER
10. Kind of Injury		
11. Cause of Injury		
12. Causative Agent		
13. Part of Body Injured		
14. Degree of Injury		
15. Supervision		
16. Immediate Action Taken		
17. Location of Accident		
Activity of Person		
19. Unsafe Act		
20. Unsafe Mechanical or Physical Condition		
21. Unsafe Personal Factor		

22. Description of Accident (What Was Pupil Doing?)

23. Corrective Action Taken or Recommended

24. Amount of School or Other Property Damage $	25. Date of Report
26. REPORT PREPARED BY - SIGNATURE AND TITLE	27. PRINCIPAL'S SIGNATURE

SCHOOL OFFICE

Figure 1: Accident Report Form for Elementary and Secondary Schools

accurately. In these cases, staff in the department make corrections based on the limited information available. Thus, the validity and reliability of the data derived is not as great as it could be. (49:np) Another serious problem within the plan's operation is that accident reporting is the first and last process for many school people. Few schools conduct follow-up studies which could lead to corrective action. The Louisiana Plan, with its unique features and typical problems associated with the reporting and collection of accident data, is none the less an experienced operation which provides strategies and procedures which can be beneficial to other statewide system developments.

The Kansas Plan. This student accident plan is sponsored by the State Department of Health and Environment. It was initiated in 1934 and has been continually revised for improvement purposes. The State Department of Education became involved with the system in 1972 by providing each participating school district with a yearly print-out of the accidents reported by that particular district. While this was a beneficial involvement, the Department of Education has discontinued this activity due to lack of funds. The yearly print-out of accidents reported by each school district has likewise been discontinued.

Currently, the materials and forms used to explain the system are forwarded to each school superintendent or administrator at the beginning of each school year. A cover letter introduces the student accident program to those not already familiar with it and urges the participation of each school district in the State. The letter is signed by the Secretary of Health and the Commissioner of Education.

This system has a unique report form which is mostly self coding except for the item "description of the accident". Upon receipt of the individual accident reports in the State Office in addition to coding the description of the accident, two other codes are given to each accident. One is a National Safety Council code which classifies the accident either by a location where the accident occurred or by a type of activity or agent involved. The other is a sports code which is given to an accident where a person is injured while participating in sports.

Most schools report on a monthly basis and data from each accident report are edited and then transferred to a code sheet and forwarded to the Data Processing Section to be key punched for computer processing of the data. The data tabulations (using the National Safety Council Codes) are provided annually to the Council for inclusion in national statistical tabulations.

This system is a general one designed to be accountable for all accidents. Accident data regarding sports is collected by the reporting process but does not place a primary emphasis on sports accidents per se. The annual *Kansas Student Accident Report* presents and discusses sports accidents including interscholastic, intramurals, physical education and playground activities. Tabulations provided to the National Safety Council include distributions of different types of sports accidents by grade for male and female victims.

This plan is conducted on a voluntary basis and nine out of ten Kansas school districts participate in the program. On this basis, it is obviously a highly successful operation. Its management, procedures and materials warrant further study by those contemplating the development or improvement of a general statewide system or one specifically for sports.

There are only a few other states in which statewide accident data systems are operational for elementary and secondary schools. It should be self-evident that complete accident data systems, in elementary and secondary schools, following a systematic statewide plan has significant potential for the surveillance of sports accidents. Assuming the statewide plans discussed are representative of the few states which operate a statewide system, refinements which will provide better response capabilities, with regard to scope and intracacies of sports accidents, need to be identified and precise corrective measures implemented. These improvements are feasible but time consuming.

In terms of total values and benefits, the development of effective statewide accident data systems for all elementary and secondary schools is the most important of all approaches to the

overall improvement of sports safety programs. Organized group action toward this goal should become a priority in every state.

Statewide Systems For Institutions of Higher Learning

There is no statewide accident data system in which all institutions of higher learning participate. (42:29-35) In a few institutions a general system has been developed which gives a good accounting of the sports accident situation. (18:1-30) A discussion of the reasons why more institutions have not developed systems is beyond the scope of this chapter. However, it should be mentioned that one of the reasons is that valid and reliable accident datanot been available to pinpoint accident problems and to guide corrective actions. (18:4)

For the most part, in the institutions where systems are maintained, the design and materials have been developed to meet local needs. Selected examples are briefly discussed to illustrate the contributions different general systems can make to the surveillance and control of sports accidents.

University of Minnesota. The accident data system of the University of Minnesota is sponsored by the University Health Service and administered by the Department of Environmental Health and Safety. Sports injury reporting is part of the total student injury reporting procedure. It does not develop the detail or achieve as complete a report on all minor injuries as would a specialized scheme which initiates reports at the various sports headquarter offices.

The basic operational policies and tenets established for the system are to:

1. Maintain a brief form design which can be expediently filled out so that persons responsible for reporting accidents will not bypass the information requested because of the length and complexity of reporting forms.
2. Require the report to be filled out in one central place where the maximum completeness can be monitored (depending on persons responsible for each sport activity to complete and forward accident reports is not functional).
3. Have injured student complete the report form (when physically able).
4. Even if 100% reporting is not achieved, a high percentage of all types of student injuries will indicate high risk areas and trends to guide injury control efforts.
5. Emphasize that all individual accident reports be submitted to the campus safety office within 24 to 48 hours so that follow-up action on special hazards where indicated can be instigated.

In this system, each student reporting to the Health Service for medical care of an injury completes the report form shown in Figure 2. It is estimated that the system generates reports for about 85 to 90% of the student injuries requiring medical evaluation that occur on the campus. Athletic injuries that are reported are estimated to be less than these percentages, especially in varsity sports. This is because of treatment of minor injuries on site by the trainer or team physician. The staff in the campus safety office review individual reports on a daily basis and initiates investigations of accidents that indicate a physical hazard caused or was related to an injury. Trends or patterns such as a high frequency of eye injuries or a series of injuries that appear to relate to lax officiating and the like are followed up in cooperation with the Athletic Department.

Michigan State University. A summary of the accident data system at Michigan State University is provided to illustrate the unique benefits which can be derived from a general system for the prevention and control of sports accidents. Based upon data from the general system, a special study of the sports accident problem was initiated. Priority was given to men's physical education and intramural activities because of the increasing numbers of students participating in those programs. The source of data for the special study included the accident reports completed by staff members in the Physical Education and Intramural Departments,

UNIVERSITY OF MINNESOTA
UNIVERSITY HEALTH SERVICE

Accidental Injury Report Form

(11-12) (13-14)
Date of Report_____

Completion of this form will allow the University to direct intelligently its efforts toward elimination of conditions and procedures that produce injuries.

Name_____ Age_____
(1-10) (Last) (First) (Middle) (15-16)

Sex M F (O.P. age) ID_____ Date of injury_____ Time_____ a.m. p.m. (O.P. 22)
(17-18) (19-20) (21-22)

Status at time of accident: (23) (1) Student ☐ (2) Employee on duty ☐ (3) Visitor or Tradesperson ☐
(4) Employee off duty ☐

Supervisor or Instructor_____
(The person, if any, directing your activity at time of accident)

Location Where Accident Occurred_____
(Be specific so others could locate)

A. Your Department or College_____
(24-25)

Circle ONE number only under each appropriate column

B (26) On Campus Location	C (O.P. 26) Off Campus Location	D (27-28) Activity	E (29) Specific Sport
1. Academic bldg. other than lab. or shop	1. Recreational area	1. Instruction	1. Baseball
2. Laboratory	2. Place of employment	2. Research	2. Basketball
3. Shop	3. Home or other residence	3. Maintenance or construction	3. Football
4. Residence hall	4. Fraternity or sorority	4. Service	4. Hockey
5. Service building	5. Street or highway	5. Daily living	5. Gymnastics
6. Place of public assembly	6. Walk ways	6. Pedestrian	6. Skiing or tobogganing
7. Athletic facility	7. Store, public building, etc.	7. Vehicle use	7. Swimming
8. Grounds, fields, open areas	8. Grounds, fields, open areas	8. Varsity sport	8. Track
9. Street or walk	9. Other_____	9. Intramural sport	9. Wrestling
10. Other_____	_____	10. Physical education	10. Other_____
_____		11. Recreation	_____
		12. Other_____	

If an off-campus location, was activity University-sponsored? Yes ☐ No ☐

Describe Accident

Include device, machine, material or condition involved and describe activity engaged in at time of accident_____

_____

_____

_____

If more space is needed, write on back

STAFF USE ONLY

F (30) G (31-32)
Type of injury and part of body involved_____

H. Estimated Disability (33) 1. None 2. Minimal or Mildly Restrictive 3. Disabling 4. Permanently Disabled 5. Death

(REVERSE SIDE FOR ADDITIONAL STAFF USE)

HS 33 (0) Signature:_____

Figure 2: Accident Report Form developed by the University Health Service for use at the University of Minnesota

30

physical education activity enrollments lists, intramural participation summaries, and accident statistics from the University Health Center. Due to certain limitations in the accident reporting system, the number of incomplete reports and the small number of reported accidents in certain activities, only an analysis of actions leading to injuries in selected sports activities was conducted. Due to lack of accurate data the severity of accidents was not analyzed. During this study many weaknesses in the system were discovered and certain revisions were made. Another advantage of the study was that the injury rates obtained from the five and six years of the investigation were available for comparison purposes in subsequent years. (18:ii)

While there were several conclusions listed for the study, one was concerned specifically with the need for the "development of a more comprehensive system of injury reporting and analysis as a basis for developing a sound accident prevention program. This would require a closer follow-up of each injury to determine the exact nature of the injury, the severity of the injury, the days lost from school, specific details on how the injury occurred and how the injury might have been prevented. (18:3)

There are, no doubt, a few other institutions which maintain accident data systems but detailed information related to nature and scope of the operation, materials and problems could not be located in the related literature. Numerous inquiries in search of exemplary information and materials regarding other systems, with a few exceptions, were not productive.

This perspective is a sad commentary when institutions of higher learning have moral, legal, and financial responsibilities to the millions of students under their jurisdiction. (24:12) The changes needed for institutions to vigorously and systematically live up to these obligations is not likely to come about until effective accident data systems are developed and maintained. Since sports accidents typically rank high among all other accidents in frequency and severity it would seem that sports leaders employed in institutions of higher education ought to be the leaders in initiating and improving general accident data systems, or at least a specific system for sports in their own institutions.

Chapter 4

SELECTED ACCIDENT DATA SYSTEMS FOR SPORTS

National Athletic Injury Reporting System (NAIRS)

NAIRS is a recently developed surveillance system for collecting and reporting athletic injury/illness data in a uniform manner. The system was "conceived out of the reality that existing sports injury data were incomplete, obsolete, or fallacious." (13:105) It is designed to provide a practical means for obtaining and interpreting continuous information on the incidence of athletic injuries/illness (to male and female) and associated circumstances. (20:2) It also has great potential for operations on a national scale.

The concept of NAIRS has been discussed, refined, and found supportable by a steering group comprised of representative leadership from national organizations interested in sports administration and sports medicine. An interorganizational national advisory body has been established to sustain interest in the system and contribute to the policy formulations needed for governance purposes. (20:2)

Currently NAIRS is headed by a principal investigator who is responsible for data interpretation and review of research-related access requests. A coordinator for the system is responsible for coordinating the data collection process, including the training and monitoring of recorders in close cooperation with the National Athletic Trainers Association. (20:2)

Significant Aspects of the System. NAIRS is designed specifically for varsity sports in educational institutions for which weekly and reasonably detailed information is needed or warranted. However, the system design would permit sponsors of any organized sport activity to participate with inexpensive modifications. Therefore, factors which significantly influence the frequency and severity of athletic injuries and illness can be monitored in a variety of settings. (13:3) A major contribution of the system is the establishment of baseline data or endemic levels of occurrence of injury/illness problems among athletics under varying conditions from which patterns of prevalent factors that influence incident experience can be observed. Trends and patterns can be determined and assessments made as to whether a shift in frequency has occurred. The resulting evidence from these detections can be used to guide decisions regarding corrective measures. In addition, the reference data bank kept current by the system is a valuable asset to the conduct of indepth investigations. (20:2)

Another significant aspect of the system is that it can service any organized athletic sport — male, female, or coed groups; school, college, university or agency. Surveillance capabilities for physical education, intramurals, and recreation programs can be accomodated. The record forms, codes and statistical analyses are formulated for accountable decision making tasks of sports personnel and for the scientific process of inquiry. (59)

Reporting and Data Collection Process. NAIRS input organization is planned for a low-cost operation rather than a high-cost one and, therefore, is not dependent on the use of highly trained investigators or medical record libraries or recorders. For this reason certified NATA (National Athletic Trainers Association) athletic trainers have been designated as the key

persons in the data collection and reporting process. The organizational flow of duties and responsibilities of key personnel are as follows:

NAIRS Coordinator: Athletic trainer at Headquarters Office who supervises the operation of the data collection process and the training/consultation of system personnel.

District Coordinator: Athletic trainer in each of 10 geographical districts (NATA) who supervise NAIRS' interests.

Cluster Coordinator: These coordinators are athletic trainers who supervise the use of NAIRS in a particular locality.

Recorder: The recorder is the one who fills out NAIRS forms for a given institution.

Athletic Director: The person who oversees the intervention of NAIRS and monitors the protocol preferred by the institution for interpreting NAIRS requirements and periodic results. (13)

NAIRS Terminology. Fundamental to the operation of the system are basic definitions which help the recorder complete the forms accurately and with understanding. (13:6) The definitions are specified for recording potentially significant injuries and are purposely designed to avoid analysis of nuisance injuries. The key definition prescribes the disabling character of any injury, that is, any injury/illness that keeps the athlete from participation on the performance day (practice or game) following the day of onset is reportable. Selected definitions developed for the system, with accompanying anecdotes, are as follows:

ATHLETE (PARTICIPANT): A male or female student is a "participant" if he/she maintains candidacy for varsity competition by subscribing to the institution's eligibility rules, procedures, and schedule.

PARTICIPATION (RETURN TO PARTICIPATION): An athlete is "participating if he/she has health supervisory clearance *or* coach permission for engaging in activities generally expected of the athlete's varsity teammates.

PRACTICE (PARTICIPATION-DAY): Only those coach-directed sessions which include physical activity are recordable practices.

REPORTABLE INJURY/ILLNESS: Injuries and illnesses meeting any of the following definitions are reportable. This means that a *Case Abstract* must be filed. These definitions are meant to separate the nuisance injuries which warrant little attention and do not materially affect performance from the health problems which have potential or demonstrated significance.

1. Any *brain concussion* is reportable if it causes cessation of the athlete's participation for observation before return to play is permitted.
2. Any *dental injury* is reportable if it *should* receive professional attention.
3. Any injury/illness which causes cessation of an athlete's customary participation throughout the *participation-day following day of onset* is reportable.
4. Any injury/illness which requires *substantive* professional attention before the athlete's return to participation is permitted is reportable (i.e., *without such attention, the athlete would not have been permitted to return to participation that day and the next participation-day).* (13:6-8)

Reporting Forms. NAIRS reporting forms are labeled "abstracts." Brief descriptions are as follows:

1. *The Institution Abstract* seeks basic information about the overall sports program. It is completed once a school year, preferably near the beginning. (13:12)
2. *The Sports Season Closeout Abstract.* This abstract provides basic information concerning the administration of the particular sport involved and it signifies to NAIRS that the season for the sport is ended. A sample completed abstract is shown in Figure 1.

CODE 0 OR 00 IF "UNKNOWN" CHECK OR PRINT CODES THAT APPLY

1. INSTITUTION ☐☐☐☐☐☐☐ 2. SPORT ☐☐

NAIRS–I
75–76
SPORT SEASON CLOSEOUT ABSTRACT

3. PRIMARY PHYSICIAN SUPERVISION

(1) Team Physician(s), Institution Staff
(2) Team Physician(s), Community based
(3) Clinic/Hospital
(4) Community Physicians as needed
(5) Other

Also Code:
(1) M.D (3) D.C
(2) D.O (4) Other

4. PRIMARY NON-PHYSICIAN SUPERVISION

(71) Athletic Trainer, NATA Certified Member
(72) Athletic Trainer, NATA Associate Member
(73) Athletic Trainer, Other
(74) Coaching Staff (77) Emergency Care Personnel
(75) Student (78) Parent
(76) School Nurse (79) Other _____

5. COACHING STAFF SIZE ☐☐

6. HEAD COACH

Sex
(1) Male
(2) Female

Education
(1) Bacc. Degree, PE major or minor
(2) Bacc. Degree, other
(3) Masters Degree, PE major or minor, undergrad or grad
(4) Masters Degree, other
(5) Doctorate, PE major or minor, undergrad or grad
(6) Doctorate, other
(7) No college degree

Experience Coaching This Sport
(1) 1–2 years
(2) 3–5 years
(3) 6–10 years
(4) 10 + years

Experience Playing This Sport
(1) 1–2 years, h.s. only
(2) 1–2 years, college only
(3) 3–6 years, h.s. only
(4) 3–6 years, college only
(5) 3–6 years, h.s. and college
(6) 3–6 years, college and post college
(7) 6 + years, college and post college
(8) None

7. COACHING PREFERENCES*

1 – Yes

	Pre-Season	In Season
Isometrics	☐	☐
Endurance Training	☐	☐
Weight Training	☐	☐
Flexibility Training	☐	☐
Taped Ankles	☐	☐
Wrapped Ankle	☐	☐

*Record yes if prescribed routinely for squad

8. PRESEASON MEDICAL EXAM

(1) Required only for athlete's first sport of year
(2) Required for each sport
(3) Required only for athlete's first sport in institution
(4) Not required

9. FACILITIES*

	Surface
Primary Practice Arena	☐
Home Contest	☐☐

*See item 12 in Code Book under the respective sport

10. EQUIPMENT*

		Type	Brand	% of Squad	Vintage
HEADGEAR	1	☐☐	☐☐☐	☐☐	☐
	2	☐☐	☐☐☐	☐☐	☐
	3	☐☐	☐☐☐	☐☐	☐
	4	☐☐	☐☐☐	☐☐	☐
DENTAL GUARD	1	☐☐	☐☐☐	☐☐	
	2	☐☐	☐☐☐	☐☐	
SHOES, Natural Surface	1	☐☐	☐☐☐	☐☐	
	2	☐☐	☐☐☐	☐☐	
	3	☐☐	☐☐☐	☐☐	
	4	☐☐	☐☐☐	☐☐	
SHOES, Artificial Surface	1	☐☐	☐☐☐	☐☐	
	2	☐☐	☐☐☐	☐☐	
	3	☐☐	☐☐☐	☐☐	
	4	☐☐	☐☐☐	☐☐	
		☐☐	☐☐☐	☐☐	☐
		☐☐	☐☐☐	☐☐	☐
		☐☐	☐☐☐	☐☐	☐
		☐☐	☐☐☐	☐☐	☐

Code for Vintage
1 – New this season
2 – New previous season
3 – Used previous season
4 – Reconditioned for this season
5 – Reconditioned previous season(s)

*See item 15 in Code Book under the respective sport

11. PURCHASE OF PERSONAL EQUIPMENT (shoes, helmets, etc.)

(1) Institute responsibility
(2) Athlete responsibility
(3) Shared, primarily institution
(4) Shared, primarily athlete

12. WIN/LOSS RECORD

(1) Won at least two-thirds of contests
(2) Won between one-third and two-thirds of contests
(3) Won less than one-third of contests

RESEARCH (1) ☐☐ (2) ☐☐ (3) ☐☐ (4) ☐☐

Figure 1: Sample Form of NAIRS Sports Season Closeout Abstract

Participant Abstract. The participant abstract obtains descriptive information that may be potentially pertinent but not needed for recording every injury episode. To allow time for the squad composition to stabilize the abstract is not submitted until at least the third week of the sport season. (13:21) The abstract form is shown in Figure 2 (13:23) the accompanying reporting code is presented in Figure 3. (13:24) Descriptive details for filling out the form are provided to recorders in the systems handbook of instructions.

The Case Abstract. This form, shown in Figure 4, is used for recording the details of each episode of a reportable injury or illness. (13:30) The NAIRS field form shown in Figure 5 was developed to assist in this function. (13:27) The Case Abstracts for 1975-76 are in table form so that carbon copies can be made. Immediate reporting on this form allows the system to rely on weekly data flow and to prevent a backlog of data.

Weekly Transmittal Abstract. The two functions served by this abstract are to remind recorders to keep current on case abstracts and to provide important information required for epidemiological analysis of injury rates. This abstract form is shown in Figure 6. (13:37)

Abstract Codes for Selected Sports. NAIRS codes for each selected sport abstracts are made available to system recorders. As one example, the code for the volleyball abstract is shown in Figure 7. (13:85-86) Special instructions are given for each sport code as needed for any particular abstract. In volleyball, for instance, the special instructions are concerned with the weekly Transmittal Abstract and the recorder is told "to count number of games played, not matches, or contests." (13:85)

NAIRS forms can be used for all sports which enables users of the system to shift from one sport to another without logistical problems. A recorder's handbook and the respective codes for each sport serviced is provided to each user of the system. The forms can be filled out by any athletic trainer, student trainer or other selected personnel. They can comply with NAIRS procedures with minimum orientation although conscientious attention to the forms, codes, and completeness is expected. Selected athletic trainers are utilized by NAIRS to supervise or monitor geographical clusters of system recorders. (59)

Early in the season, basic information which does not change (for that season) is collected once on the sport and the athletes and is computerized. During the season (of that sport) all reports of injuries are submitted to NAIRS at the end of each week with a weekly transmittal sheet identifying additional information or number of games or practices, and average squad size for the week. (59)

In NAIRS, data are recorded for every reportable occurrence from date of onset to date of the athlete's return to performance. From this information NAIRS analysis distinguishes the potentially significant minor injury/illness (i.e. return to participation within a week) from the moderate (between one and three weeks), the major (more than three weeks), and the severe (permanent disabling injury such as paraplegia). To monitor perspective, NAIRS can also classify the significance of medical care such as surgery, bed rest and the like. (59)

The data analyses which are provided by NAIRS are derived from a series of simply coded forms. NAIRS can connect within the computer potential factors of influence in the search for patterns of injury/illness and patterns affecting a type of injury. Injury rates can be determined and expressed epidemiologically using squad size, number of games or practices, type of player, (i.e., substitute, star, regular) age, height, weight and other variables. In addition, rates can be expressed by proportion of athletes using a particular sports product, playing a particular position, engaged in a particular sport and so forth. Descriptive information such as coach characteristics, agency or school size, and the like can be made available and utilized as pertinent. (59)

NAIRS is designed for the return of both periodic reports and *ad hoc* reports. The monthly report to each participating institution includes case reports and summary tables providing an inventory of injury experience to date. A seasonal report summarizes injury experiences at the end of a given sports season. Both reports provide perspective by listing both the school's

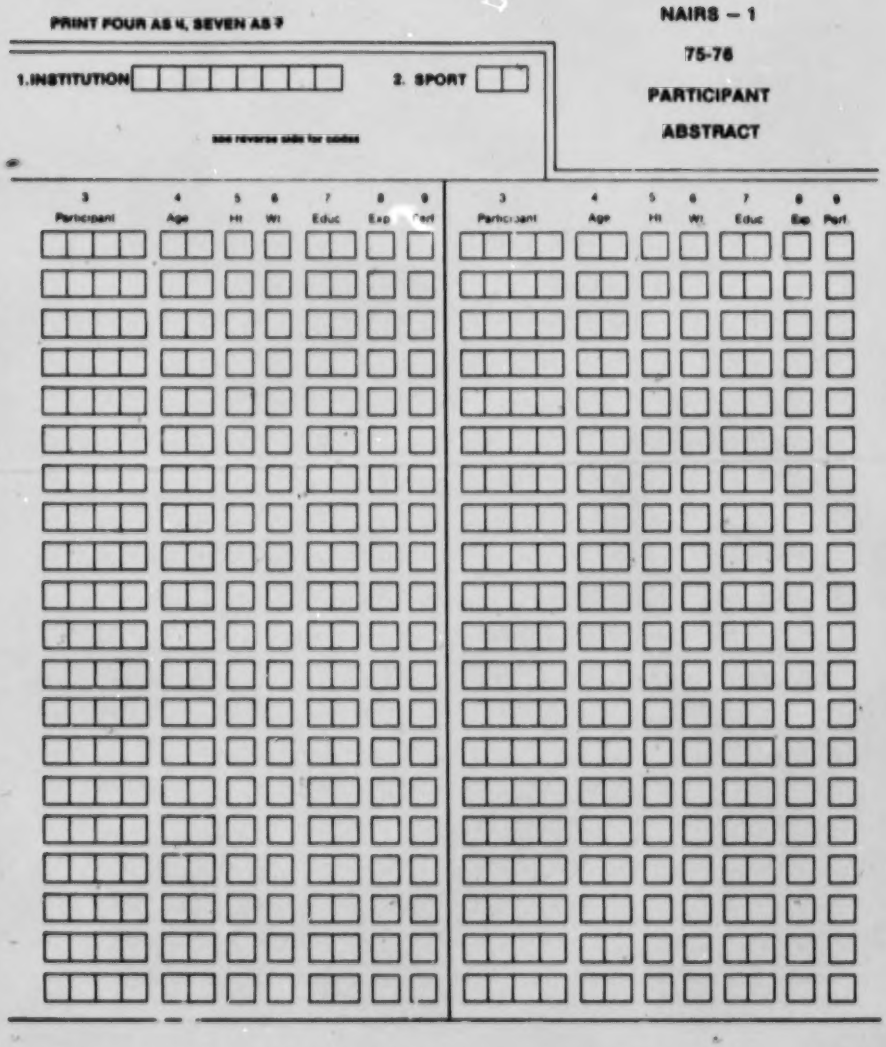


Figure 2: Sample Form of NAIRS Participant Abstract

CODE FOR PARTICIPANT ABSTRACT

1. Sport Code

	Male	Female	Mixed
Archery	21	51	81
Baseball	01	31	61
Basketball	02	32	62
Bowling	22	52	82
Crew	23	53	83
Cross Country	30	50	80
Curling	24	54	84
Fencing	03	33	63
Field Hockey	04	34	64
Football, Tackle	05	35	65
Football, Other	06	36	66
Golf	25	55	85
Gymnastics	07	37	67
Ice Hockey	08	38	68
Judo	26	56	86
Lacrosse	09	39	69
Rodeo	10	40	70
Rugby	27	57	87
Skiing	11	41	71
Soccer	12	42	72
Softball	13	43	73
Squash	28	58	88
Swimming/Diving	14	44	74
Tennis	15	45	75
Track & Field, Indoor	16	46	76
Track & Field, Outdoor	17	47	77
Volleyball	18	48	78
Water Polo	29	59	89
Wrestling	19	49	79
Other: _____	30	60	90

3. Participant Use NAIRS Log

4. Age Use nearest age at season's onset

5. Height

1-- less than 5'0"
2-- 5'0" - 5'3"
3-- 5'4" - 5'7"
4-- 5'8" - 5'11"
5-- 6'0" - 6'3"
6-- 6'4" - 6'7"
7-- 6'8" +

6. Weight at beginning of season, (Wrestlers use initial official weigh in)

1-- less than 112
2-- 112 -124
3-- 125 -139
4-- 140 -154
5-- 155 -169
6-- 170 -189
7-- 190 -209
8-- 210 -234
9-- 235 +

7. Year in School

(09 - 9th grade; 13 - 1st year in college)

09 10 11 12 13 14 15 16 17

(00 = not in school)

8. Experience in Sport*

1-- 1 year
2-- 2-3 years
3-- 4-5 years
4-- 6 + years

*Years under formal coaching, this sport, including this season.

9. Performance Rating

1-- Star (unusual skill at this level of competition)
2-- Regular (expected to play in every game even if not a starter)
3-- Substitute (not expected to play in every game)

Figure 3: NAIRS Code for Participant Abstract. (Printed on reverse side of form)

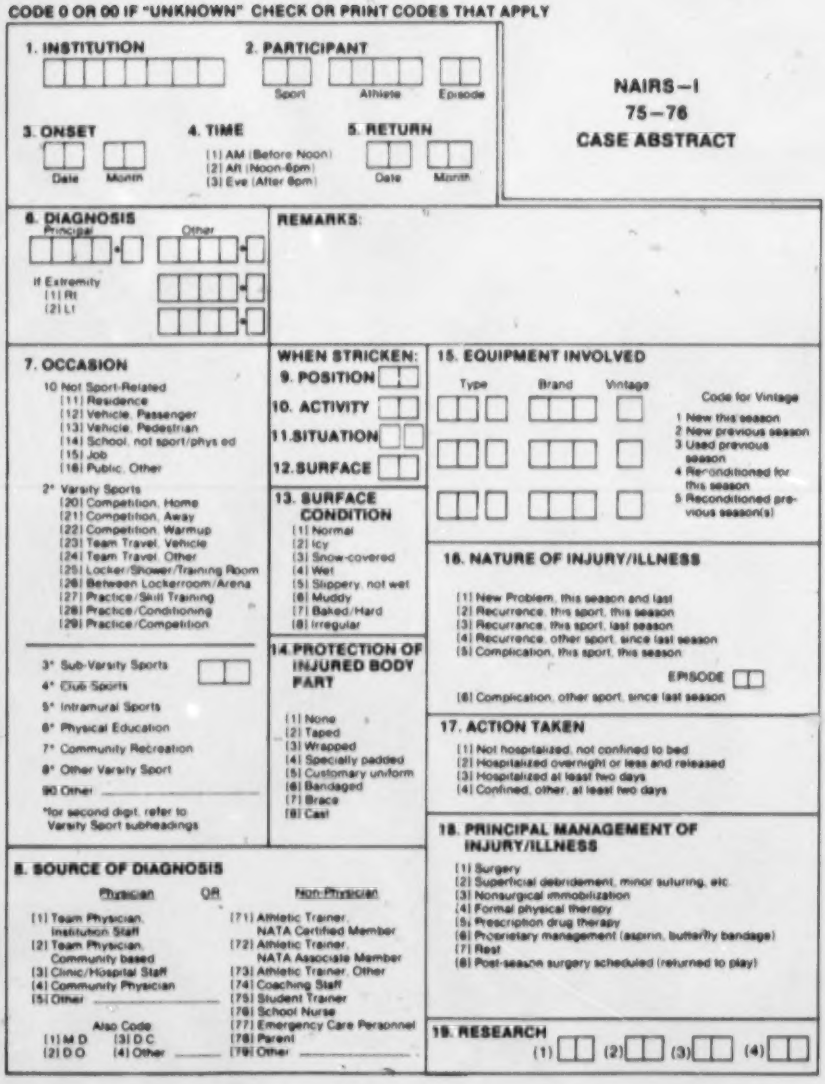


Figure 4: NAIRS Abstract Form for Reporting Details of Reportable Injuries

NAIRS Field Form

Athlete _____

Sport _____ Date _____

Time: ☐ A.M. ☐ Aft. ☐ Eve.

Injury _____

☐ Practice/Skill Training
☐ Practice/Conditioning
☐ Practice Competition
☐ Game/Home
☐ Game/Away
Circumstances:

Figure 5: NAIRS Field Form for Use With Case Abstract Form

experience and the experiences of the schools or agencies of comparable types. In addition to these periodic reports, NAIRS can provide current data of relevance within a day of an inquiry from a participating user, qualified researchers, and rules committees. (59)

All NAIRS data are strictly confidential. Each school or agency served by the system is provided with a log sheet on which to record a code number for each athlete. If the athlete is injured only the code number is indicated on the injury report forwarded to NAIRS headquarters. The injury records of one school or agency are never released to another. (59)

The exact cost for NAIRS services will not be known until early experiences and a thorough system analysis of the data processing design are completed. However, it is designed for low-cost operations and functions as a non-profit activity. The operational service costs will be affected to a great extent by the number of user subscriptions plus the amounts of grant funds attracted to help support the system. When completely operational the annual subscription cost has been estimated at $50.00 (59)

The design and implementation of NAIRS is needed and has great potential for assisting workers in the sports world to become more accountable for eliminating or minimizing sports accidents which lead to significant injury/illness. While the nature and scope of the system is quite limited when compared with a complete data system (as defined within this monograph) it is the most significant thrust yet undertaken for the development of a sports accident data system which can be responsive to the unique needs of sport activities. The systematic efforts of the system's leaders in designing and implementing the system are to be commended. Such efforts should be supported by every person, agency or organization interested in the improvement of sports in general and safety in particular — locally and on a national scale.

Annual Survey of Football Fatalities

A national study of football fatalities is supported annually by the National Collegiate Athletic Association, American Football Coaches Association, and the National Federation of State High School Associations. It has been conducted annually since 1931 except for 1942.

PRINT FOUR AS 4, SEVEN AS 7

1. INSTITUTION ☐☐☐☐☐☐☐☐

SPORT ☐☐

NAIRS-I 75-76
WEEKLY TRANSMITTAL ABSTRACT

2. WEEK OF MONDAY, date ☐☐ month ☐☐ THROUGH SUNDAY date ☐☐ month ☐☐ year ☐☐

3. VARSITY EXPERIENCES DURING WEEK

Case Abstracts		Number of Contests*			Average Squad Size Per Contest	Surface of Away Contest**	Nos. of Practice Sessions	Average Squad Size Per Practice
Completed	Pending	Home	Away	Overtimes				
☐☐	☐☐	☐☐	☐☐	☐☐	☐☐☐	☐☐	☐☐	☐☐☐
☐☐	☐☐	☐☐	☐☐	☐☐	☐☐☐	☐☐	☐☐	☐☐☐

*Special instruction for reporting number of Contests

BASEBALL/SOFTBALL. Use number of innings played in regulation time instead of number of games for Contests. Use number of innings played beyond regulation time for Overtime

FENCING. Use number of individual matches, not team meets, for number of Contests

TENNIS. Use number of individual matches, not team meets, for number of Contests

VOLLEYBALL. Count number of games played, not matches, for Contests

WRESTLING. Use number of individual matches, not team meets, for number of Contests

**See item 12 in Code Book under respective sport

REMARKS:

Recorder

Figure 6: NAIRS Weekly Transmittal Form

For all items: 0 or 00 - Unknown

(9) *POSITION WHEN STRICKEN:*

10 — Offense
- 11 — Front line
- 12 — Backcourt

20 — Defense
- 21 — Front line
- 22 — Backcourt

90 — Nonparticipant, sideline
- 91 — In uniform
- 92 — Not in uniform

(10) *ACTIVITY WHEN STRICKEN:*

10 — Spiking
20 — Passing
30 — Serving
40 — Receiving
50 — Blocking
60 — Digging

80 — Unintended Collision, Other
- 81 — with person in bounds
- 82 — with net/standards
- 84 — with sideline obstruction
- 85 — with endline obstruction
- 86 — with ball

90 — Other, no contact
- 91 — Agility drills
- 92 — Skill drills
- 93 — Sprinting
- 94 — Endurance running

96 — Fighting

(11) *SITUATION WHEN STRICKEN:*

a) Play:
- 1 — Serve
- 2 — Normal pass-spike-block play
- 3 — Backcourt spike
- 4 — Clear
- 5 — Dump

b) Period:
- 1 — 1st game; 1st fourth of practice period
- 2 — Middle games; 2nd fourth of practice period
- 3 — Last game; 3rd fourth of practice period
- 4 — Last game; 4th fourth of practice period
- 5 — Last game; post practice period

(12) *SURFACE WHEN STRICKEN:*

27 — Wood
28 — Portable floor
21 — Concrete
22 — Asphalt
23 — Tile
24 — Cinder
25 — Sand
10 — Natural turf
9* — Artificial surface

*Age: 1-First year; 9-Maximum

(15) EQUIPMENT — 1st 2 digits — 3rd digit

Dental Guard (use with oral injuries)
18 — Stock (readymade)
19 — Custom (personalized)
20 — Dental Guard not worn

1 — Dentist fit or supervised
2 — Non-dentist fit

Corrective Lens (use with eye injuries)
21 — Spectacles, standard quality
22 — Spectacles, industrial quality
23 — Contacts, corneal
24 — Contacts, scleral
25 — Corrective lens not worn

1 — Glass lens
2 — Plastic lens (hard)
3 — Soft lens

Shoes (use with foot, ankle, and knee injuries)
60 — Low cut
70 — High top
80 — Inbetween
69 — Shoes not worn

Field Equipment (use when relevant to injury)
97 — Barbells
98 — Weight training apparatus

Figure 7: NAIRS Codes for Volleyball Abstracts, 1975-76 (13:86-87)

The project was initiated in 1931 by the American Football Coaches Association for the purpose of making the game of football a safe and more enjoyable sports activity. (8:1)

The American Football Coaches Association and the National Collegiate Athletic Association in 1965 appointed Carl S. Blyth to direct the Annual Survey Report on the college, professional and sand lot levels. David C. Arnold, of the National Federation of State High School Associations, assumed responsibility for collecting and preparing data on all high school football fatalities. At the conclusion of the 1974 football season, both reports were compiled into a final report titled *Annual Survey of Football Fatalities 1931-1974*. (8:1)

All during the year, upon notification of a suspected football fatality, contact is made immediately with appropriate officials. The fatality report forms are returned and in many cases, include cover letters, providing supplementary information. On conclusion of the football season, the data are compiled into an annual report and made available for distribution. It includes information on the number of fatalities directly related to football, age of players, activity engaged in, part of body involved, and specific location of the injuries. (9:46-48)

The game of football has benefited in many ways as a result of these surveys. Data evidence has been used in support of rule changes and the improvement of equipment. Examples of specific results are: 1) mouth guards are now required to be worn by high school and college players, 2) football teams in colleges and universities are required to practice in shorts for the first three days of pre-season drills to acclimate players to heat, and 3) the number of practice days each team can have before the first game is controlled by regulation. (9:47)

Every person involved in the game of football, especially those in leadership roles, need to study carefully each year the fatal accident data provided in this annual report.

SPORTS ACCIDENT DATA AVAILABLE THROUGH STATEWIDE INSURANCE BENEFIT PLANS

Certain types and amounts of sports accident data can be derived from statewide accident insurance plans for injuries sustained in school-sponsored events. The few states which have such a plan collect a considerable amount of data, including accident statistics. If appropriately analyzed, presented, and applied, the accident data can contribute significantly to the improvement of accident experience in selected sports. The limitation of these plans, however, is that their primary purpose and design is to provide insurance coverage.

The "real world" value of such statewide plans can be illustrated by examining the Accident Benefit Plan in the State of Wisconsin. It was inaugurated during the 1930-31 school year and was the first of its type in the United States. (68: 48) "The basic philosophy on which this plan was founded was to assist parents in payment of medical expenses by providing reasonable reimbursement based on a premium within the economy of all schools and parents." (96)

The plan is administered by the Wisconsin Interscholastic Athletic Association (WIAA). It is entirely self-supporting with fees paid by participating schools. The accumulated funds provide benefit payments according to predetermined payment provisions and limitations for injuries occurring to students of schools who participate voluntarily in the plan. (93) The plan is designed to supplement other insurance policies under which an injured student may be covered. (94)

After an injury, the school completes Part I of the WIAA Pupil Coverage Claim Form which is shown in Figure 8. It asks for important information concerning the accident, including the exact cause. Part II of the form solicits certain insurance information from the parents or guardians of the injured athlete.

After Parts I and II have been completed, the form is forwarded to the attending physician and/or dentist who completes Parts III and IV shown in Figures 9 and 10 and then returns it to the school.

Form P1

WIAA ACCIDENT BENEFIT PLAN

PUPIL COVERAGE CLAIM FORM

(PLEASE PRINT OR TYPE)

PLEASE LEAVE BLANK

Claim No. _____

Type Fee Paid _____

School Code _____

PART I: STATEMENT OF CLAIMANT AND PRINCIPAL

Principal _____ Student (PLEASE PRINT) _____

School _____ Age _____ Sex _____ Grade _____

City _____ Zip Code _____ EXACT DATE OF INJURY: _____

1. Activity participating in when injured ☐ Phy. Ed. ☐ Recess ☐ Intramurals ☐ Classroom ☐ Noon-Hour Activity OR _____
2. Place where injury occurred _____ Time of accident _____
3. EXACT CAUSE OF INJURY (Be specific) _____
4. Nature of injury: _____
5. Name of teacher present and supervising activity at time of accident _____
6. Amount requested from Benefit Plan $ _____ If total claim exceeds $50, other coverage carried by parents will be a factor in determining amount of our payment.

Signature of Principal _____ Date _____

Figure 8: The Pupil Claim Form for the WIAA Benefit Plan — Part I

PART III: STATEMENT OF ATTENDING PHYSICIAN

1. The nature of the injury was: _____
   A. If luxation indicate number of returns: _____
   B. If fracture or dislocation check one: No Reduction _____ Closed Reduction _____ Open Reduction _____
2. Describe treatment: _____
3. Was an X-ray taken? Yes _____ No _____ If yes, by whom? _____
   X-ray report: _____
4. First date of treatment: _____ Date of discharge: _____ Final prognosis: _____
5. In your opinion, were there any pre-disposing factors and/or pre-existent conditions contributory to the injury? If so, describe: _____
6. Was other expense incurred? If so, give name of any consulting or assisting physician or surgeon or hospital: _____
7. General Remarks: _____

Signature and Title _____ Print Name _____

Make Check Payable To – (If clinic, please indicate) Address _____

8. Statement: City-State _____ Zip Code _____

Date	Services Rendered	Amount

(Kindly Itemize Your Account)

PLEASE LEAVE BLANK ☐

Payment $ _____

ATTENTION PHYSICIANS AND DENTISTS: Return this statement to the school as soon as treatment is complete but no later than one year from the date of injury even though treatment may not be complete. CLAIMS NOT FILED WITHIN ONE YEAR FROM THE DATE OF INJURY CANNOT BE CONSIDERED FOR PAYMENT.

Figure 9: WIAA Claim Form for Attending Physician — Part III

PART IV: STATEMENT OF ATTENDING DENTIST

State specifically the exact location of the injury, and mark the chart accordingly.

R	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	

1. Describe the injury giving the character, extent, and complications _____

2. Nature of injured teeth at time of injury: Natural _____ Artificial _____ Crowned _____ Defective _____ Sound _____

3. Describe treatment, any operation, and necessary restoration _____

4. Date injured first appeared for treatment: _____

5. Date treatment completed: _____

Signature and Title _____

Print Name _____

Address _____

City-State _____ Zip Code _____

Date	Services Rendered	Amount

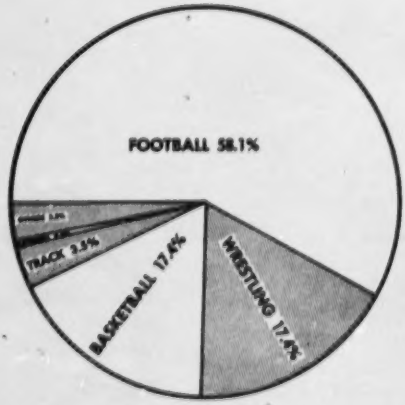
(Kindly Itemize Your Account)

Figure 10: WIAA Claim Form for Attending Dentist — Part IV

Football Accounts for Over One-Half of All Athletic Injuries

Breakdown of Injuries

	71-72	70-71	69-70	68-69
Football	6,027	6,408	6,411	6,451
Basketball	1,809	2,046	2,109	2,043
Wrestling	1,805	2,012	2,014	1,973
Track	259	700	749	739
Cross Country	164	126	119	93
Baseball	46	228	119	196
Swimming	37	47	45	36
Hockey	14	45	34	15
Gymnastics	42	53	38	46
Tennis	14	21	21	22
Volleyball	11	13	12	5
Golf	6	11	8	10
Skiing	8	6	7	13
Curling	—	2	3	1
Total	10,372	11,718	11,888	11,846



1971-72 School Year
June 30, 1972 Statistics
Approximately 90% Complete

Figure 11: The Number of Injuries in Selected Sports for School Years 1968-69 Through 1971-72 With A Percentage Breakdown for 1971-72

Breakdown of Injuries

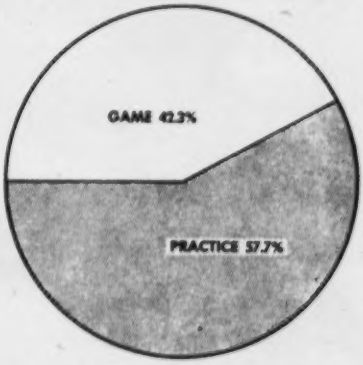
1971	
Game	2,692
Practice	3,332
Total	6,024

1970	
Game	2,707
Practice	3,699
Total	6,406

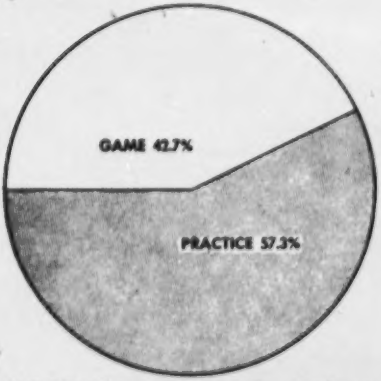
1969	
Game	2,740
Practice	3,671
Total	6,411

1968	
Game	2,775
Practice	3,676
Total	6,451

1971 Season
June 30, 1972 Statistics
Approximately 95% Complete



1970 Season — Complete



1969 Season — Complete

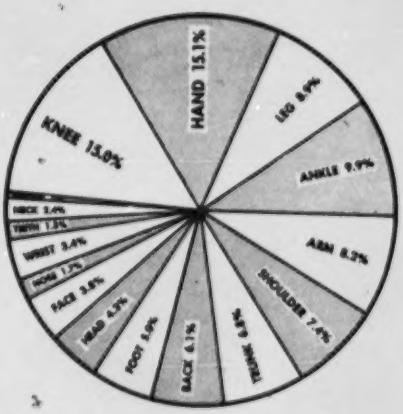
1968 Season — Complete

Figure 12: Breakdown of Football Injuries Which Occurred During Games and Practices for Seasons 1968-71

Knee, Hand, Leg, Ankle Injuries Sustained Most Frequently in Football

Breakdown of Injuries

	1971	1970	1969	1968
Knee	907	1,027	1,001	1,025
Hand (and Finger)	914	914	930	917
Leg (except knee)	539	572	607	599
Ankle	597	654	629	613
Arm (Above wrist)	497	495	489	497
Shoulder	445	433	432	439
Trunk (except Back)	408	468	410	396
Back	368	403	371	439
Foot (and Toe)	303	339	357	358
Head	259	275	258	302
Face (except Nose)	230	253	259	275
Nose	103	137	141	151
Wrist	208	208	224	200
Neck	146	131	144	131
Teeth	93	105	115	105
Internal	35	30	33	27
TOTAL	6,041	6,434	6,419	6,444



1971 Season
June 30, 1972 Statistics
Approximately 95% Complete

Figure 13: Percentage of Appendage Injuries Sustained in Football During 1969-71 Seasons

After receiving claims submitted by participating schools, WIAA summarizes and analyzes the data. An example of the way WIAA presents a breakdown of injuries in several sports is shown in Figure 11. (93:33)

To illustrate the scope, meaningfulness, and presentation style of the WIAA plan, more complete breakdown of injuries in football is provided in Figure 12. It shows the injuries which occurred during game and practice sessions over four seasons. (95:35)

Injuries sustained most frequently in football according to WIAA are shown in Figure 13. (95:38-39) A comparison of the graphs reveals that the highest percent of injuries occurred to knees, hands, ankles and legs, in that order, for all three seasons.

The number and types of football injuries due to sprains and bumps for 1968-71 seasons are shown in Figure 14, with accompanying percentage charts. (95:40) According to the charts, sprains, contusions and fractures were the most frequent injuries. Injuries in this category comprise over 70% of all football injuries.

Several other means exist for presenting sports accident data derived from the WIAA plan. For instance, when special studies are needed for a specific purpose, information in the data bank can be retrieved, analyzed, and reported. Summary data from one such study of athletic dental injuries is shown in Figure 15. (95:40) Although the estimated number of players increased for each sport one notes that the number of dental injuries tended to decrease.

Another special study was conducted using data from this plan to determine the effectiveness of football face masks and dental guards. The results are presented in Figure 16. (95:41) The findings again indicate a decrease in the number of dental injuries while the number of players continually increased over a 15-year period.

Another unique feature of this plan is the annual feedback each participating school receives concerning their accident experience. The WIAA form used for this purpose is shown in Figure

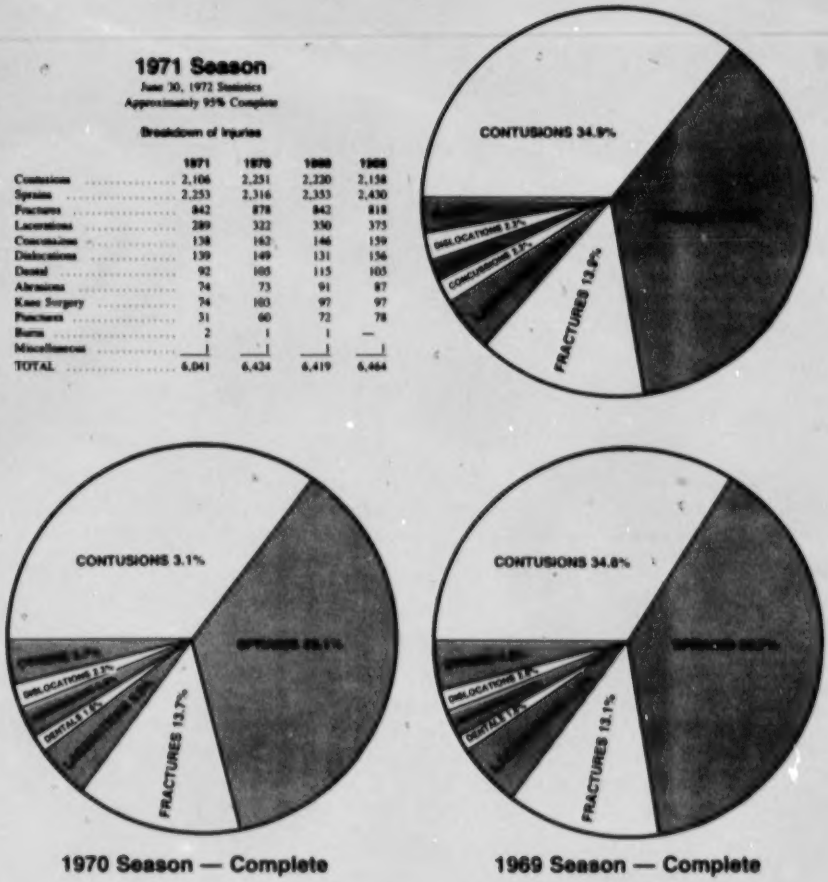


Figure 14: Numbers, Types and Percentages of Football Injuries Due to Sprains and Bumps for 1968-71 Seasons

17. A list of suggestions is included on the back of the form, for improving claim experience. The list provides important guidelines as shown in Figure 18. (96:)

In comparison to an effective accident data system as defined in this monograph, statewide accident benefit plans will always have critical limitations. However, such plans can and do make significant contributions toward the prevention and control of sports injuries. In fact, one of the strong features of the Wisconsin plan is actually preventive in nature. For example, a boy or girl may not participate in interscholastic athletic competition until a medical examination is completed and a permit card is signed by a licensed physician attesting to the participant's medical fitness. Because the information on many of the cards indicates conditions considered to be of a disqualifying nature, and yet were not being considered as such by the examining physician, a guide was prepared to assist physicians in their evaluation of athletic candidates.

Athletic Dental Injuries

Figures as of June 30, 1972

School Year	Sport	Players	Dental Injuries	Injury Ratio
	Football	38,360	92*	0.2398*
1971-72	Basketball	16,000†	97*	0.6063*
	Wrestling	16,000†	99*	0.6188*
	Football	38,934	105	0.2697
1970-71	Basketball	16,000†	126	0.7875
	Wrestling	16,000†	117	0.7313
	Football	36,662	115	0.3137
1969-70	Basketball	16,000†	120	0.7500
	Wrestling	16,000†	112	0.7000
	Football	35,801	105	0.2933
1968-69	Basketball	16,000†	150	0.9375
	Wrestling	16,000†	105	0.6563
	Football	34,059	97	0.2848
1967-68	Basketball	16,000†	126	0.7875
	Wrestling	15,000†	120	0.8000
	Football	34,298	112	0.3265
1966-67	Basketball	15,000†	135	0.9000
	Wrestling	11,000†	104	0.9455
	Football	31,455	126	0.4005
1965-66	Basketball	15,000†	136	0.9067
	Wrestling	11,000†	99	0.9000
	Football	31,259	129	0.4127
1964-65	Basketball	15,000†	126	0.8400
	Wrestling	11,000†	136	1.2364

*Claim year not complete. Project 110 football dental injuries (injury ratio 0.2868), 130 basketball dental injuries (injury ratio 0.8125) and 125 wrestling dental injuries (injury ratio 0.7813).
†Estimated number of participants.

Figure 15: Summary Data of Athletic Dental Injuries in Three Sports for Years 1964-65 Through 1971-72

Year	Protection Status	Number of Players	Number of Dental Injuries	Injury Incidence
1954	No face masks and no dental guards	15,714[a]	356	2.265
1955	Face masks but no dental guards	15,714[a]	288	1.833
1959	Face masks mandatory but few dental guards	22,969[b]	275	1.197
1960	Face masks mandatory but few dental guards	24,177[b]	301	1.245
1961	Face masks mandatory; about 1/3 dental guards	26,507[b]	272	1.027
1962	Face masks mandatory about 1/3 dental guards	28,747[b]	292	1.016
1963	Face masks and dental guards mandatory	30,357[b]	143	0.4711
1964	Face masks and dental guards mandatory	31,259[b]	129	0.4127
1965	Face masks and dental guards mandatory	31,459[b]	126	0.4005
1966	Face masks and dental guards mandatory	34,298[b]	112	0.3265
1967	Face masks and dental guards mandatory	34,059[b]	97	0.2848
1968	Face masks and dental guards mandatory	35,801[b]	105	0.2933
1969	Face masks and dental guards mandatory	36,662[b]	115	0.3137
1970	Face masks and dental guards mandatory	38,934	105	0.2697
1971	Face masks and dental guards mandatory	38,360	92 (110)[d]	0.2398[c] (0.2868)[d]

a controlled experiment
b number of football players in Benefit Plan
c incomplete year
d anticipated final figures

Figure 16: Summary Data of Findings from a Special Study to Assess Effectiveness of Football Face Masks and Dental Guards

W.I.A.A. ACCIDENT BENEFIT PLAN

STEVENS POINT, WISCONSIN

ADMINISTRATIVE OFFICES, STEVENS POINT, WIS. 54481

YOUR SCHOOL EXPERIENCE REPORT

FOR SCHOOL YEAR —

(FIGURES AS OF JUNE 30TH)

THE BENEFIT PLAN IS PLEASED TO PRESENT THIS REPORT OF YOUR SCHOOL'S CLAIM EXPERIENCE.

This report is addressed in accordance with the address indicated on your Benefit Plan enrollment form. If you are not responsible for Benefit Plan coverage in your school(s) please forward this report to the person(s) in charge of your Benefit Plan.

ATHLETIC COVERAGE

CLASSES COVERED	NO. OF PUPILS COVERED	FEE	NO. OF PUPILS INJURED	TOTAL AMOUNT OF CLAIMS PAID	STATE WIDE INJURY RATIO	
—		$		$	.	

PUPIL COVERAGE

CLASSES COVERED	NO. OF PUPILS COVERED	FEE	NO. OF PUPILS INJURED	TOTAL AMOUNT OF CLAIMS PAID	STATE WIDE INJURY RATIO	
—		$		$	.	

YOU MAY WISH TO COMPARE "YOUR SCHOOL(S) INJURY RATIO" (NUMBER OF INJURIES PER 100 STUDENTS) WITH THE STATEWIDE AVERAGE. SUGGESTIONS FOR IMPROVING YOUR INJURY RATIO ARE LISTED ON THE BACK OF THIS FORM.

IF YOU HAVE ANY QUESTIONS OR COMMENTS REGARDING THIS REPORT, PLEASE DO NOT HESITATE TO CONTACT US.

Figure 17: Form Used by WIAA to Report Accident Experience in Participating Schools

Statewide benefit plans can also serve to develop a keener awareness of the value of accident data for use in improving safety programs in general or specifically for sports. Most Wisconsin schools, for example, participate in the WIAA plan and the accident data derived therefrom in many instances are the only accident records kept by the school. While these records are maintained primarily for insurance claim purposes, the data can also be used in resolving local sports safety problems. In fact, the WIAA claim items can easily be expanded for local use to include additional facts or information related to school activities to guide improvements in the total school safety program. It is an elementary alternate way to maintain at least a limited accident data system when no other can be developed.

Without effective plans, such as WIAA of Wisconsin provides, some alternative, statewide improvement of sports safety programs is not likely. The lack of coherent national sports accident data which could be provided by such plans leaves serious gaps in the objective design of corrective measures. In the final analysis, the athletes and their families are the losers, not only physically, but also emotionally and financially.

Professional workers in sports, safety, and administration as well as parents and students, could wisely direct more effort toward establishing or improving statewide accident benefit

IF YOU WOULD LIKE TO IMPROVE YOUR CLAIM EXPERIENCE
HERE ARE SOME SUGGESTIONS

1. Are the physicians and hospitals in your area familiar with the aims and objectives of the non-profit, school sponsored Benefit Plan? Copies of our coverage provisions are available for distribution.

2. Do all your injuries occur in activities covered by the Benefit Plan? Injuries incurred at home, on weekends, to and from school, etc., and sent to us for settlement require time to screen and cause delays in the payment of valid claims.

3. Are all of your coaches, nurses, physical education teachers and administrators briefed on the Plan? The Plan is YOURS. Anything which can be done to stress safety and prevention of accidents will benefit the school, the student, and the Plan. The child who has an accident on the merry-go-round at noon under the supervision of a classroom teacher requires treatment and incurs medical expense just like the football player. Are these teachers safety-minded and briefed on correct play-time procedures? Do you use the school injury record sheet for claim analysis?

4. Is proper use being made of the Doctor's Certificate required for all athletic injuries? It is your responsibility to see that no boy is allowed to return to athletics following an injury until the date indicated on the Doctor's Certificate keeping in mind the minimum days-out requirements for certain types of injuries.

5. Does your school require a written statement of clearance from the doctor before a student is allowed to return to physical education class following an injury or illness? A student who is still under the influence of an injury or illness may further injure himself if allowed to resume full activity without first being cleared by the attending physician.

6. Have you made a survey within your school to determine what injuries could have been eliminated?

7. Organization - Supervision - Facilities - Equipment - Equality of competition in practice as well as games, physical education, and free play are all important factors in the prevention of injuries.

THE BASIC PHILOSOPHY ON WHICH THIS PLAN WAS FOUNDED WAS TO ASSIST PARENTS IN PAYMENT OF MEDICAL EXPENSE BY PROVIDING REASONABLE REIMBURSEMENT BASED ON A PREMIUM WITHIN THE ECONOMY OF ALL SCHOOLS AND PARENTS.

Figure 18: WIAA Suggestions to Participating Schools for Improving Claim Experience

plans. Such attempts to be successful will require vigorous, intelligent, and coordinated action by dedicated leaders. Resource agencies which may be helpful include:

Wisconsin Interscholastic Athletic Association
41 Park Ridge Drive
Stevens Point, Wisconsin 54481

Michigan High School Athletic Association
815 Washington Square Building
Lansing, Michigan 48933

New York State Public High School
Athletic Association
138 Washington Avenue
Albany, New York 12210

Specialized Accident Data Systems for Sports

A considerable amount of sports accident data has been provided by a variety of sports research in which the study design called for accident data of some kind. The nature and scope of the data are necessarily limited by the purpose and objectives of each particular study.

Nonetheless, many of the studies have contributed significantly, not only to accident facts and information related to sports, but to the state of the art in sports accident data system developments. Some examples are:

1. *The 1970 Intercollegiate Tackle Football Injury Surveillance Report*, sponsored by the Joint Commission on Competitive Safeguards and Medical Aspects of Sports. (47:1-32)
2. *The National Football League 1973 Injury Study*, sponsored by the National Football League. (28:1-127)
3. *NCAA Football Head and Neck Injuries in Eastern Colleges for 1974 Season*, sponsored by NCAA Committee on Competitive Safeguards and Medical Aspects of Sports. (65:1-9)
4. *An Epidemiological Study of High School Football Injuries in North Carolina – 1968-72*, supported by the Environmental Control Administration and the U.S. Consumer Product Safety Commission. (7:1-192)
5. *British Columbia Amateur Lacrosse Association: Lacrosse Injury Study*, sponsored by the Fitness and Amateur Sport Branch, Department of National Health and Welfare, Ottawa, Ontario. Canada. (45:61-109)
6. *British Columbia Amateur Hockey Association: Hockey Injury Study*, sponsored by the Fitness and Amateur Sport Branch, Department of National Health and Welfare, Ottawa, Ontario. Canada. (44:1-29)
7. *Ski Injury Etiology: An Eight Year Study of the Influence of Skier and Equipment Factors*, sponsored by Massachusetts Institute of Technology, Cambridge. (99:1-27)
8. *Diving Accident Survey, 1946-70*, Scuba Safety Report Series, Report #5, sponsored by the University of Rhode Island, Kingston. (70:1-35)

Anyone contemplating the initiation or refinement of a general system or a specific one for sports can benefit from careful examination of these studies. They are valuable references also for sports researchers who desire to design a sport accident data system for a particular investigation.

Chapter 5

BASIC CONSIDERATIONS FOR ACCIDENT DATA SYSTEM DEVELOPMENTS IN SPORTS

The Organizational Process

The functional efficiency of an accident data system is directly proportional to the thoughtful considerations and decisions involved during the early planning stages. (53:7) If the initial design and operational plan are developed in a systematic manner the implementation and maintenance stages can be relatively simple.

The priority a sports accident data system should receive, and the need for an organized approach, was aptly given by Schwank:[1]

> Reporting, collecting and analyzing data on sports injuries, the first of four themes for the congress, is properly listed first, for we must base our actions regarding safety in sports upon valid and reliable data. I would not take off for a backpacking trip through one of our beautiful wilderness areas in Montana without a topographical map. Neither should we, without significantly reliable data, campaign for changes in football rules, attempt to set standards for protective sports equipment or make complaints or recommendations to the Consumer Product Commission, the Football Rules Committee, or any other such commission or committee. Without the map, without the data, one must surely wander, get lost, or at least encounter problems that he should have been able to avoid.

Communications. An organized communication network is critical to the development of an effective system. It can be successful only if designed for a balanced two-way approach. Someone must conceive, formulate and transmit system information to receivers. However, the communications are effective only if the recipient's gain the same or equivalent factual or mental picture of the messages as intended by the sender, and vice versa. The baseline for all communications is to promote and expedite the attainment of the system's mission and objectives. Communication sources, whether human, machine or otherwise, evolves in some form from the earliest stages of system development on through continuing refinement stages. An effective communication network is the only means to coordinate all the varied efforts of numerous personnel interested in and associated with system developments. (34:1)

While there is no scientifically derived communication model for a sports accident data system, there are established principles which can provide guidance in designing and implementing a system communication plan. (5:1-15) In topical outline form these are:

1. Determine objectives
   a. Increase awareness
   b. Change attitudes
   c. Achieve acceptance

[1]Personal communications written by Walter C. Schwank, and provided to the author on June 4, 1975.

d. Obtain support

2. Analyze the receivers (audiences)
   a. Agency administrators and staff
   b. Heads of departments, divisions, areas
   c. Participants
   d. Parents
   e. Representatives of community and state agencies
   f. News media
3. Select appropriate techniques for reaching each audience
   a. Clarify system definitions
   b. Obtain receiver involvement
   c. Utilize social action (which emphasizes shared values and objectives)
4. Evaluate the effectiveness of the communications process
   a. Through a systematic assessment scheme
   b. Informal questionnaires
   c. Person to person interviews
   d. Analyze responses (related to system and communications objectives)
   e. Make appropriate changes

The tasks associated with developing a valid communication network are not easy to master. For the system administrator or coordinator, it is a particularly difficult role. He must not only transmit system information up, down, and across lines to agency administrators, workers, participants, and others, but he must do so in a manner which motivates them to act on the information provided. (34:1)

As system technology and procedures become more sophisticated, many opportunities will evolve for transmitting information and data, both print and non-print, rapidly from one place to another both within and outside the system. What will likely develop eventually is a comprehensive, multi-purpose information network for sports accident data, which is flexible and interactive. It will deal with many different kinds of information, available in many different locations, and flowing through numerous channels.

Philosophy. The organization and management of an effective sports accident data system require a philosophical platform which is uniformly acceptable especially by those responsible for administrative decisions and operational functions. It is basic that philosophical considerations revolve around an honest search for the truth about potential and actual accident events. This goal will not only influence the conservation of human and material resources, but will promote the worthwhileness of living in general. It will also provide factual evidence to protect and defend the integrity of sports activities in a rational objective manner.

The underlying philosophy established for the system sets the tone for specifying purpose. An effective system should have three correlary purposes which are: 1) to provide valid and reliable statistical data from which effective measures can be formulated to prevent accidents or minimize the consequences of those which do occur, 2) to provide factual-based direction and guidance toward enhancing the nature and intrigue of sports and the development of supportive restraints which protect the welfare of all participants, and 3) to provide accident facts and interpretative information for appropriate application in developing and improving the total safety program. The first purpose should receive the primary emphasis simply because the other two cannot be accomplished until the first one is well on the way toward successful attainment.

A further tuning process of the underlying philosophy developed for the system is the determination of terms and defintions. One of the most critical and persistent needs in the development of effective systems for sports is for uniform terminology which is valid and acceptable to users. The terms and definitions should be carefully selected, precisely defined

and uniformly applied by the system's leaders and other input personnel. Persons with responsible roles in the system must understand each one and its appropriate use in operational applications.

The significance in developing valid and succinct definitions is analogous to the old adage that what comes out (corrective measures) can be no better than what goes in (accident data). Although the selection and definition of terms appropriate for a particular system is never easy, the process can be expedited when precise statements of the purpose and objectives of the total system have been determined. When all terms and definitions are uniformly stated and understood legitimate comparisons can be made with accident data from a wide variety of sources. Without such standardization valid comparisons are not possible. The lack of uniform definitions also complicates the selection and use of terms. Understandable and definitive terminology is essential to the usability and effectiveness of the systems development process.

Authority. Planning and operating a sports accident data system without designated authority is similar to building a house on a sand foundation. When all is well things may be fine but when trouble brews a crumbling of foundation and structure begins. The legal authority is vested in the chief administrator or board of the parent agency, be it a school, university or other public or private institutions. Legal authority, regardless of sources, carries with it certain responsibilities which cannot be delegated.

The person who is assigned and accepts the responsibility to develop and maintain a sports accident data system should be certain that the responsibility is officially designated by the legal authority, preferably in writing. The nature, scope, and duties should be prescribed, understood, and agreed upon by both parties. Nowhere in a safety program is this more critical than in the development of an accident data system, because the operational functions such as reporting, investigations, remedial and evaluative actions often require coersive type actions which tend to be ineffective unless responsibilities have been delegated by legal authority.

Policies. Especially as related to sports accident data system, policy statements need to be clearly written, following the decision-making process which sets the direction for the system. Policies are basic to the implementation of a functional operation and each one can be expediently implemented to the extent that the systems leaders and workers have contributed to the policy statements and understand the meanings and values associated with each. Examples of some general policies are:

1. All departments, divisions, or systems in which any sports activity is conducted will participate in the uniform accident data system as related to the particular sport(s) involved,
2. A qualified person will be assigned the responsibility of coordinating and monitoring the total accident data system for sports,
3. The system will be conducted according to established uniform policies and procedures for reporting, investigation, analysis, summarization, dissemination and follow-up evaluations, and
4. Complete details will be recorded on all sports accidents and near-accidents which may be potentially dangerous.

An example of specific policy is:

The person immediately responsible for the sports activity shall notify the proper authorities when a serious accident occurs.

Budgeting. The budgeting process is an extremely important function in the development and operation of an effective data system. Effectively coping with this challenge requires the system's leaders to thoroughly understand the financial conditions, sources of income, and the desired outcome of the parent agency in order to properly manage the budgeting affairs of the accident data system. Budgets should be based on justifiable needs without guesses or

assumptions. Lump sum budgeting is valueless as well as dangerous. (19:1)

A system coordinator or manager who wants definite budget commitments for the system operations may have to prepare one on his own initiative. He can then seek administrative sanction of the concept and proceed from there. A known budget can expedite precise planning and conduct of system operations. In the final analysis a budget is needed whether officially approved or not. If properly designed and followed, the cost-benefit ratio of the system can be demonstrated. In so doing, the process of obtaining both initial and future funding necessary to the effectiveness of the system will be enhanced.

Personnel. Qualified leadership is required to organize, manage and maintain an effective sports accident data system. Such personnel must be interested, sincere, and dedicated to the attainment of the goals established for the system. Fundamental knowledge of the basic components of the system and how each relates to the other is a basic need. While agencies which sponsor sports activities have been negligent in providing inservice learning opportunities for system leaders and workers, there are those who are willing to learn to carry out their duties in a vigorous prideful manner. Many of them have gained their expertise about system developments "on the job", and in other types of inservice programs. In those agencies where a system has been carefully organized and appropriate aims, objectives, and procedures have been established, a qualified energetic person with assigned authority for this function has been the leader.

A persistent personnel problem is the recruitment and selection of supportive staff and on-line workers to assist the system administrator. Many of the helpers, ranging from staff to participants, are needed mostly on an individualized basis. However, one of the more powerful means of obtaining supportive assistance is through group actions by means of formalized or ad hoc committees, special study or task force groups, and the like. Their assignments or functions can vary from general to specific. It is pertinent that these groups include balanced representation of various interests among system users and supporters. When possible the core members of the group should include at least a physician, nurse, parent, athletic trainer, athletic director, coach, safety coordinator, physical education teacher, administrator, custodian, facilities manager, student or participant and a dentist.

Education. The organizational efficiency of a sports accident data system will depend upon the education provided for leaders and workers alike. The intricacies and complexities of all the system's elements cannot be fully understood without supportive organized learning opportunities. The range of educational needs begins during the planning stage, extends through the operational phase, and continues on through the improvement and refinement phases. New personnel will need an orientation to the system and experienced personnel will need refresher and reinforcement learning opportunities. While the educational mode selected is important it is more critical that the design, content, and sequence of the education program emphasize the system's purpose, values and procedures. Priority should be given to the duties and responsibilities of system reports with a two-pronged emphasis upon observed potential hazards and complete and accurate details of an accident event. Persistent motivational strategies should be used in the educational program to assure recorders and investigators that valid and reliable data can be obtained only through the caliber of their reports.

Facilities. It is important that headquarters facilities be designated for identity of the system as an integral part of the sports sponsoring agency. Such a facility promotes the efficient use of available manpower time and expedites the management of system operations. Adequate furnishings, working spaces, communcations devices such as telephones and the like are minimum requirements. Special consideration must be given to arrangements which insure that accident records are filed and stored in an organized manner for immediate or future use. The decisions and provisions needed for the headquarters facility should not be a major problem

since much of the system operations are carried on outside the headquarters offices. Personnel, such as reporters, agency administrators, computer staff and others will be conducting system work in their own facility areas.

Evaluation. An integral and important part of an effective system development is an evaluation plan. Conceptually, the evaluation of the system may be viewed as the process of determining the decision areas of concern with regard to sports accidents. This includes selecting, collecting, analyzing, and collating significant information to help system decision makers choose among alternate priorities. Objective decisions cannot be made without data-based facts and information that relates the decisions to improvement changes. (6:99)

For several reasons, the evaluation of a sports accident data system can be a problem for agency administrators and the system leaders. First, the end product of the system has never been defined well enough to permit anyone to determine the extent to which the system is "successful". Second, the total system operates in an informational vacuum; some data which are generated are unused because they are irrelevant; other data receive no response by system leaders or workers because they are not considered data. Finally, the process involved in evaluation is threatening. It connotes value judgments being placed upon the system leaders; and it connotes hours of hard work for the system administrator who already has a heavy workload and probably has little, if any, released time designated for system tasks. (26:xi-xii)

The need and value of an evaluation plan for determining the effectiveness of a sports accident data system cannot be overemphasized. It is the key to the survival and improvement of the system. Evaluation methodology and technology which is applicable for this purpose are available. If sports accident data are to flourish and produce valid and reliable data, the evaluation plan must be given a top priority in the organizational structure of the system.

The Reporting Process

The reporting process is the foundation of an effective accident data system for sports. It involves a systematic development of a scheme which instigates prompt and accurate reporting of accidents and/or near accidents on appropriate forms by responsible agency personnel. It is important that planners formulating this process do so in close alignment with the mission of the agency sponsoring the sport. Particular attention needs to be focused on the agency's specific interest in establishing and maintaining an accident data system. These considerations are prerequisite to the determination of staff commitments, responsibilities, and budget which are among the first things that need to be known before the reporting process can be functionally shaped.

In planning or refining the reporting process, it is important that key administrators, staff, and participants be encouraged to provide their ideas, suggestions or criticisms. This approach, if done in a purposeful and sincere manner, is an excellent way to enhance their interest and support of the system. Graciously heeding and publicly recognizing their contributions is a key influence in gaining their trust, confidence, and active participation in system operations.

A dominant concern in the planning of the reporting process, of course, should be the stated aims and purposes of the total accident data system. Regardless of what these may be, there are certain elements of the reporting process which are essential.

Terms and Definitions. It is fundamental that terms and definitions which are applicable to the reporting process be determined and understood by all personnel with input responsibilities and leadership roles. Since final determinations depend upon the purpose and objectives of the total system, and the agency it serves, there are many different variations in the terms and definitions employed. Examples of fundamental ones for reporting sports accidents have been identified and defined by Silverwood. In his introductory comments, he perceptively pointed out that "reporting processes are not identical for all purposes and there are differences in reporting

practices among high school, college, and agency programs because of the variations in organizational responsibilities to the participant." (71:66) Since his definitive work remains pertinent his terms and definitions relating to the reporting process are quoted as follows:

Participant. An individual permitted by a school or agency to take part in one of its sponsored activities.

Accident, sponsor jurisdiction. An accident that occurs on the property established by the sponsor to serve the practice or competition of participants and during the period that participation is sponsor sanctioned.

Accident, nonschool jurisdiction. An accident that occurs outside the jurisdiction of the sponsor.

Accident, reportable. A sponsor-jurisdiction accident which results in an injury to a participant. Customarily, a reportable accident occurs when the injury requires first aid or medical treatment. Under this reporting plan, often no differentiation is made between "reportable" and "recordable" accidents.

Accident, recordable. A sponsor-jurisdiction accident which results in injury to a participant and deprives (or would deprive) him of medically approved complete participation in that activity on the day following injury.(71:66)

These examples illustrate the critical role definitions have in formulating the reporting process. Additional varieties are provided to emphasize the need for clarity and specificity of a definition and the guidance they can provide for different purposes.

Injury. "An injury is defined as one which occurred as a result of participation in an organized football program at the high school level, for which medical treatment was received, or which resulted in restriction of the boy's usual activity, for one day beyond the day of injury." (64:184)

Reportable injury. "A reportable injury is one which requires the injured to desist from the activity, absent himself for a period of time and require either first aid or medical attention. An injury to the hand, neck or spine must be reported, regardless of how slight it appears to be. (69:61)

Disability Injury is any injury which results in death; permanent total, permanent, partial, or temporary total disability which occurred in the course of employment. (90:3)

Non-disabling injury is any injury which requires medical treatment including first aid, but does not result in death, permanent impairment or temporary total disability. (90:3)

Recordable accident is "any accident which results in a) severe pupil injury which causes the loss of one-half day or more of school time, or b) nonschool time, and/or c) a school jurisdictional accident which causes any property damage." (53:29)

"*School jurisdiction accidents* are events which occur on school property, during school sponsored activities conducted off school property or to students walking to and from school property." (53:29)

"*Students* are children, youth or adults who are officially enrolled or involved in any school sponsored classes or activities. Included are classes or other activities at any educational level or special programs, e.g., recreation, clubs, special education, headstart, and the like." (53:29)

Additional terminology related to the reporting process is provided in *Standard Nomenclature of Athletic Injuries* published by the American Medical Association. (3)

These terms and definitions point up the need for clarity and preciseness in terminology development for the reporting process. Until this is done, however, the reporting process cannot produce valid and reliable data of the volume needed for best results.

Reporting Forms. In determining the appropriate reporting forms, the content and format should be carefully selected and designed in accord with the philosophy and definitions established for the system. If all sports accidents, including near-miss types, are to be reported,

a form for that purpose will include items considerably different than in a system which requires reports, for example, of only medically treated injuries. In addition, form items may be needed to fulfill other needs such as insurance claims, legal requirements, or athletic conference regulations. In states where liability for sports accidents exist, an item should be included on the form for witnesses to sign as well as an administrator.

There is an essential body of basic information which is prerequisite to the summarization and analysis of sports accident data. If additional data for a particular purpose such as research or insurance is needed, other appropriate forms can be devised. A basic requirement, in any case, is that reporting instruments be simple enough to be completed easily in a minimum amount of time with an emphasis on the reduction of unnecessary paperwork. (71:66)

The base minimum of information needed on an accident report form are items which solicit the identification or description of what happened, to whom, when, where and why. Silverwood suggests that minimum information for sports accidents be categorized into time, location, age, type of injury and severity. He also lists the essential descriptive components as follows:

1) Time-place-activity identification,
2) Participant identification,
3) Participant complaint,
4) Description of the accident,
5) Mechanism of injury, and
6) Medical diagnosis and disposition.
7) Nature and day of medical clearance for return to a conditioning program
8) Day of medical clearance for return to complete participation. (71:66)

It should be recognized that data from these minimum report form items can produce only gross information for use in determining and implementing corrective actions. However, if creative, dedicated, and competent reporters include accurate and complete information the resulting data, even of a gross nature, can produce general evidence of problem areas and accident patterns which can be used by decision makers to direct further inquiry or implement corrective actions.

Reporting Strategies and Procedures. Assume a reporting instrument has been developed for a system, what then? What are the intricacies which reporters should know beyond the instructions provided for filling out the report form? When the form is completed, to whom is it sent? Who is responsible for corrective decision and actions? These are only a few of the many questions which must be answered.

The most vital aspect of the reporting process is the acquisition of complete, accurate and uniform reporting. Deficiencies and inaccuracies in the reporting of individual accidents can lead to faulty summaries and erroneous conclusions. The solution to this problem lies primarily in the education the reporters receive about the mechanics and standards of accurate reporting.

The communication process for routing a completed report form needs to be established and included with the instructions for use of the form. Emphasis should be on prompt reporting of emergency situations involving serious injury, routine accident occurrences, and potential hazards. For this to be done efficiently, communication directions should specify the means by which the message is to be delivered and to whom it is to be delivered. Examples of recipients are the coordinator designee for the sports accident data system, the general coordinator or director of the total safety program, the administrative head of the program unit in which the accident occurs, the agency administrator or his designee, the insurance carrier, the attending physician and other appropriate personnel as needed.

This brief description of the reporting process is intended to cover the basic fundamentals. More detailed guidance of technical details can be gleaned from the systems previously described. If the needed advancements in system development are to be expedited, the reporting process must have a continuous top priority.

The Investigation Process

The purpose of sports accident investigation is to obtain the best possible information about causative accident factors so that appropriate countermeasures may be devised to prevent similar occurrences. This process, effectively carried out, is a vital component of an accident data system. It is designed to enable an indepth search for solutions to critical accident problems. It may lead to discovery of new or unnoticed hazards which need corrective action. In addition, the scheme can provide clues for improving other elements of system functions.

Ideally and functionally all accidents need to receive investigative attention regardless of the degree of damage or whether or not an injury occurs. Priority of course, should be given to the incidents which are most numerous, or those which involve situations or conditions with high risk potential. This may involve "near-miss" episodes as well as "minor" accidents. For instance, should mouthguards become faulty by warping or cracking, such information will become known through an effective reporting process whether it is a near-miss or injurious incident. Such failures should be investigated whether or not an injury occurred.

The scope and intensity of investigations will vary with the nature and seriousness of the accident or the hazard. If a sport participant sprains a finger, the investigation may not need to be pursued further. If a participant receives a skull fracture, the scope of the investigation may need to include an assessment of the injury scene, the head protection being worn, the skill act being performed, and related circumstances. In spite of the critical role accident investigations play in the total accident data system, the process is the most neglected of all the basic components of the system.

Routine investigations of near-miss incidents or accidents in which a non-disabling injury occurs can usually be done by system personnel assigned to carry out this function. Whoever it is, needs to possess an investigative nature, and understand the goal and values of the investigation process. They should also have at least general understanding of the nature of sports activities, including specific knowledge of the human, product, and environmental variables which are potential sources of injury. Among these variables will be the rules of the sport, standards for court, field, and equipment, and the contributing causation factors commonly associated with sports activities.

Effective conduct of an investigation begins at the time each accident occurs and the investigation process should be initiated with vigorous promptness in all appropriate directions. The more delay involved, the greater the difficulty in obtaining all related facts, information, and objects associated with the accident. Memory reliability of the injured victim and witnesses decreases rapidly as time passes. Therefore, priority must be given to an immediate appraisal of the accident scene, reenacting the episode, and questioning witnesses and the injured victim. Questioning the victim, of course, should be postponed if it interferes with medical treatment of care or if the victim has excessive pain and/or emotional reactions. Prompt investigations cannot be initiated or managed properly unless systematically planned in advance of actual need.

The problem of the reliability and accuracy of what is remembered by the victim and/or witnesses can be resolved if proper interviewing strategies and techniques are followed. Specialized professional training for personnel involved with this aspect of the investigation is highly recommended.

A key strategy is to interview each person privately. If done in a group, the questions asked and the respective replies will tend to influence subsequent responses by others. The obvious gain in a private interview is that more unbiased information will be given to the investigator.

Before asking any questions, the victim or witness should be assured that the investigation is being conducted to a) find out how to prevent recurrence and consequently to protect the welfare of other participants, b) obtain facts needed for insurance claims to be submitted. It should also be stressed that the investigator is not to fix blame or to relieve the sponsoring

agency of liability for the accident.

Another strategem is for questions to be asked of the victim or witness which they are likely to know about, not what they think. To illustrate, if the question is asked, "How did the accident happen?", the response will likely be a variety of opinions which will be more or less incorrect. A better opening question to begin with is to inquire about what took place before and up to the accident event.

A prescribed plan or technique of the best way to obtain all the needed information for an investigation cannot be recommended. The causative factors, tangible and intangible, which evolve as one probes deeper and deeper for the truth, are too varied for different sports. A prime requisite throughout the investigation is to keep an open mind, eliminate personal bias, and maintain an inquisitive approach with a focus on determining basic contributing causation factors.

The facts collected from an investigation will provide evidence of the "what" and "how" aspects of the accident. Determining the "why" will depend upon an analysis of the facts. Every accident has features which include a number of possible contributing causes. These can be divided into those which involve personal protective equipment, environmental elements, and the behavioral actions associated with the sport activity. In the analysis exercise, each of these areas should receive open-minded, inquiring attention of the investigator(s). To come to a conclusion that the accident was fortuitous — "just one of those accidents which couldn't be prevented" — is less than superficial. To limit the analysis to merely personal negligence is another valueless conclusion. When negligence is involved there is an underlying reason.

Every near-miss or real accident has underlying causation features which have been previously identified as the triad of participants, products and environmental elements. If the nature of the sports activity is potentially hazardous, particular attention will need to be given to arrangements and conditions to assure that hazard potential is reduced to a minimum. If the hazardous nature of the sports activity is not so pronounced, the need for caution and concern will not be as great.

The findings and recommendations resulting from an accident investigation should purposely be discussed with decision-making personnel in the agency and leaders of the accident data system. Prompt implementation of corrective measures depend primarily upon how well this is done.

An accident investigation should culminate in corrective actions aimed at preventing recurrence. All too often, the corrective measures recommended and decided upon are not implemented. The main reason for lack of implementation is the failure to establish controls which insure that compliance will be checked and monitored.

It is the responsibility of agency administration to establish the necessary controls which insure that corrective measures are initiated. One way is to have the system coordinator follow-up on all accident investigations, with priority given to those which involve disabling type injuries. Another way is to ask the responsible department or division chief to report in writing concerning the implementation stages and results of all corrective actions. A third way is to request an oral report from the person responsible for the sport action area in which the accident occurred. Additional follow-up techniques could include a) personal inspections, b) personal observations, c) assigning a specific person to check and report, and d) check on corrective action during a safety committee meeting.

The Data Summarization Process

The process involved in summarizing sports accident data is relatively easy when planned for in a systematic manner. The focus should be upon format which allows pertinent tabulations of raw data and summarization of total figures.

Objectives. The formulation of objectives for the summarization process should be based on the purpose and objectives established for the accident data system. The basic points to consider are:

1) Determine what accident data are most needed or desired by the sponsoring agency. (53:13)

Questions to guide deliberations are: To what extent does age, weight, sex, etc. influence accident experience? What is the frequency and severity of injuries for each sport activity? What is the accident experience for each department, division, school, etc.? What locations account for the most accidents? What environmental or equipment factors are involved in the accidents? What situations and behaviors are contributing to the accidents? What do patterns and trends of accident experience indicate? What is the cost of accidents to the agency, insurance company, and participants?

2) Decide how often summarized data are desired. (53:13)

It is a basic tenet that the expediency and objectiveness of decision-making and promptness of corrective actions are in proportion to the frequency of data summaries being available for analyses and interpretive assessments. For agencies sponsoring sports activities, unless under a legal mandate such as professional sports, the frequency of summary reporting is a local decision. The agency can maintain the autonomy of its system completely or elect to participate in a system developed by an athletic or sports conference to which it belongs, or one of the systems previously reviewed. While there can be some advantages to localized summaries, there are also disadvantages. If the local system leaders are highly qualified for such a task and have strong support from agency management, more detailed summaries can be done than if a uniform system designed for use by several agencies is followed. A key disadvantage is that internal data summaries from a localized system development are not usually comparable with data from other sources. Neither can the localized data contribute to the volume of sports accident data needed to continually improve sports safety programs. (53:13)

3) Make certain that all accident report data are in accord with the definition of a recordable accident before recording the information on summary charts.

Recordable accidents for jurisdictional and non-jurisdictional accidents are to be included depending on the objectives established for the system. (53:13)

Manual Summarization of Accident Data. The most feasible techniques for sorting, compiling, and summarizing accident data are machine data processing, manual operations, or a combination of the two. The choice will depend on report volume, available budget and manpower, and data processing capabilities. The final determination will establish the basis for the type and scope of summary charts. (53:13) If the manual technique is to be employed for tabulating and summarizing the data, there are certain principles which should be considered. These are:

1) The design for the summary chart or charts should be patterned according to the arrangement of the items on the report forms.

2) The size, shape, and format of the main chart or charts should be designed to accomodate the volume of reports, number of sports activities, and number of participants involved.

3) The person transferring the data from the accident report form to the summary chart should be thoroughly familiar with reporting terminology and codes so that the information is interpreted and classified accurately.

4) Tally marks can be effectively used regardless of the volume of data. When all accident reports have been tallied onto the summary chart, tally marks can be easily converted to a number and the columns totaled, when all data have been tallied for the period desired. (53:13)

The possible combinations of summary charts are numerous. If each item on a report is valid, each can be summarized. It is strategic, however, to select the more critical items, such as lost time, hazardous behaviors, faulty equipment, and sex. Equal attention also needs to be given to the summaries, which by further breakdown, are likely to produce clues for further summariza-

tion, and so on. Accident problem areas which are known or suspected to exist are a priority clue in these decisions.

Machine Processing Summarizations of Accident Data. Another technique for summarizing data is by means of machine data processing which has the capabilities for tabulating, sorting, summarizing and printing out all pertinent information. This computerized process permits accident data to be accumulated constantly, deposited at a central place and kept ready for rapid retrieval by computer. The retrieval capability, of course, can serve several functions including the summarization of data. The main values for using the computerized data processing technique are:

1) Accident information, unavailable due to lack of staff time to summarize data, can easily be made available with maximum output.

2) It allows system staff more time for managing total system operations rather than working on the clerically oriented chores associated with the summarization of data.

3) The variety of ways data can be treated for summarization purposes can be done in a few minutes.

A critical aspect in establishing an effective summarization process for sports accident reports is for data processing and sports personnel to develop an initial understanding of the nature of each other's work. (53: 18) This sets the stage for summary and other cooperative efforts which are necessary for later development of the analysis stage. Two points are emphasized which relate to this computerized technique for summarizing data:

1) An accident report form will be needed which contains information to be coded. It will be easier to code if the information items are arranged in the order required for computer card layout.

2) An accident reporting code will be needed so that each item for which information is desired will have a code which can be key-punched onto a punched card. (53: 18)

For data summarization purposes the data processing staff will also need to know what data are needed, how often the reports are desired and what use is to be made of them. These are the same decisions which have to be made for manual data processing.

The Data Analysis Process

The analysis process basically involves the summarized total of raw data and the calculation of injury frequency and severity rates. "Frequency" is the measure of actual accidental injury experience by showing how often injury occurs. "Severity" indicates the rate at which participation time is being lost. Figuring these rates takes into account several variables such as number of participants involved, the number of participant days or hours, and the seriousness of injury consequences. Analysis processes are not identical for all purposes and agencies vary in analysis practices because responsibilities to clientele and/or participants differ. However, most analysis approaches follow similar patterns.

Since certain terms and definitions are pertinent to understanding this discussion of the analysis process, key ones as developed by Silverwood for use in sports systems are quoted as follows:

1) *Rate, Frequency.* This is the ratio of the number of recorded accidents to exposure, and is expressed in terms of participation-hour units. Twenty participants practicing for two hours, consequently, would constitute 40 participant hours.

2) *Days, Severity.* These are the classic total lost days charged for injuries resulting in disability (impaired performance in that activity). Care must be given to include days in which the participant is still disabled following the end of that sports season.

3) *Rate Severity.* This is the ratio of the number of severity days to exposure, and expresses the result in terms of days of participation or participant-hour units. (71:66)

In computing injury and severity rates, it is typical to include only disabling injuries. To a limited extent, this method enables an agency to determine the effectiveness with which injury problems among its participants are being handled and what progress is being made in controlling sports accident experiences. Safety authorities are far from uniform agreement as to the value or necessity of reporting and recording nondisabling injuries.

4) *Frequency Rate*. The injury frequency rate for sports accident experience can be determined by the following equation: (71:69)

$$\frac{\text{Number of recorded injuries} \times 1{,}000{,}000}{\text{Exposure (number of persons} \times \text{number of hours)}} = \text{Injury Frequency Rate}$$

This formula is applicable for overall injury rates for a total system, a specific system for sports only, and even for special investigations. The injury per participant hour (or man-hour) component accounts for exposure as a rate determined in presenting more realistic portrayal (hours rather than days) of sports accident experience. In adapting the equation for a special investigation of the particular sport of skiing, for example, injury rates could be presented in terms of number of injuries per thousand man skier days (msd), basing the population on the number of days lift tickets are issued. (99:3)

5) *Severity Rate*. A meaningful equation for computing severity is one which relates lost time to exposure. For example:

$$\frac{\text{Number of severity days} \times 100{,}000}{\text{Exposure (average number of persons} \times \text{number of school days)}} = \text{Severity Rate}$$

With this formula, arbitrary amounts of absence from participation are chargeable to accidents that result in death or permanent disability. In sports, where disability is more significant in terms of participant performance capabilities, definitions need to be carefully scrutinized to assure that the severity rate accurately reflects the injury situation. (71: 69)

Since the unit of exposure may need to be equally applicable to the overall situation and to specific sports activities, "hours" of participation might be substituted for "school days" in the preceding formula. In doing so, it may be advisable to change the 100,000 index to some other multiple to arrive at a workable formula for examining the frequency rate. (90: 9)

6) *Average Lost Time Charged*. Besides frequency and severity rate, a third measure of accident experience is the average participation days charged per disability injury. (90:9) This is a seldom used measure, which can reveal the seriousness of injuries, on the average. It may also reveal sports accident conditions or situations not readily apparent from a review of frequency or severity rates alone. Thus, it has potential for making possible a more complete evaluation of injury experience. Determining the relationship between the total days charged and the total number of disabling injuries, the average days lost from participation may be calculated by either of the following formulas:

$$\text{Average days lost (from participation)} = \frac{\text{Total days (of season)}}{\text{Total disabling injuries (per season)}}$$

OR

$$\text{Average days lost (from participation)} = \frac{\text{Severity rate}}{\text{Frequency rate}} \quad (90: 10)$$

Even though nondisabling sports injuries are not usually included in computing frequency and severity rates, records should be kept of them and scrutinized regularly. The records should

show, for example, the frequency of occurrence, the organizational unit in which the injuries occurred, the types of injuries and the relationships to disabling injuries. Computing the frequency rate for medical treatment cases can be done in the same manner as the disabling injury frequency rate, by multiplying the number of participant cases requiring medical (or first aid) attention by one million and dividing the product by the participant hours of exposure. (90:10)

Analytical Categories. It is essential that the record of each injury include at least one item in each of the following categories.

1. Nature of injury, i.e., principal physical characteristics.
2. Part of body affected, i.e., the part of the injured participant's body directly affected, as identified by nature of injury.
3. Source of injury, i.e., the identification of the object, substance, exposure, or bodily motion which directly produced the injury.
4. Accident type, i.e., the event which directly resulted in injury.
5. Hazardous conditions, i.e., the hazardous condition, circumstance, or product which permitted the accident type identified.
6. Agency of accident, i.e., the identification of the object, substance, or premises in or about which the hazardous condition existed.
7. Unsafe act, i.e., violation of commonly accepted safe procedure or practice which directly contributed to the occurrence of the accident type. (90:16)

Accident Analysis. After injury rates have been used to identify the administrative unit and sports activity in which injuries occur most frequently, an analysis of individual cases will provide the information necessary to determine needed corrective measures. A high frequency of injuries throughout an organizational unit or a particular sport makes an analysis of the injuries even more important. One recommendation to consider is that the analysis of sports injury reports should start with the identification of the injury and proceed sequentially through the part of the body affected, sources of injury, and accident type. These elements of injury analysis represent the maximum amount of detail which can be derived from a typical accident report. Further analysis in terms of hazardous condition, agency of the accident, and unsafe acts should be based upon accident investigation reports. (90:17)

Data Comparison Pitfalls. At the appropriate time during the analysis process, a comparison of current frequency and severity rates with those of previous years is helpful in discerning trends, patterns, or radical deviations from normal accident experience. Such comparisons can be tricky unless uniform definitions and procedures have been used in the system. Exceptional caution should be used in comparing rates and other figures compiled by a particular agency with the state or national average. In most cases, data from different systems are not compatible for comparison purposes. Furthermore, because sports statistics from national sources are of necessity based upon accident summaries which are derived often from incomplete data collection, national rates tend to be appreciably lower than of an agency which effectively obtains reports on all recordable accidents. (71:69)

In the absence of uniform definitions, valid comparisons of sports accident data from different sources is not possible and attempts to do so cannot result in trustworthy information. When it is done and corrective measures are implemented based on the data it is quite possible that more harm than good can come from the actions taken. A precisely stated accurate definition is not as critical for comparison purposes as it is for the same definition to be used as the basis for statistical treatment. If this condition is observed uniformly, then meaningful comparisons can be made.

Interpretation and Presentation of Sports Accident Data. It has been emphasized throughout this chapter that for accident data to be valid and reliable, it must, among other requirements, be collected and treated in a uniform manner. A critical aspect of accomplishing this goal is careful and legitimate interpretation and presentation of data resulting from the summarization and analytical stages. While basic interpretive guidelines can be provided by precisely stated definitions, objectives, and policies, there are always interpretive decisions to be made which fall outside the realm of these factors. Final judgment of exceptions must be made by local system decision-makers, and applied uniformly on a continuous basis as appropriate throughout the total system.

Chapter 6

THE SIGNIFICANCE OF EFFECTIVE SYSTEM DEVELOPMENT FOR SPORTS

The development and implementation of an effective accident data system for sports is significant for many reasons. One of the more important benefits accrues to the agency which sponsors the sport. By such sponsorship, the agency management indicates its interest and concern for the safety, health, and social welfare of those actively involved in the sports program which it sponsors. Such efforts have a positive influence upon the morale and performance of personnel within the agency. The "caring" atmosphere this creates can be a significant factor in motivating participating personnel to contribute to the prevention and control of sports accidents. Outcomes from these influences can increase the efficiency of the accident data system, which can result in substantial economic savings for the sponsoring agency. The information and insight which can be obtained through an effective system will also significantly contribute to the improvement of the agency's operation as a whole and the sports safety program in particular.

Another significant aspect of an effective system is its value to the personnel assigned the responsibility for the system's organization and administration. It provides them with the needed evidence to direct the system operations, improve its functions, and design immediate and long range plans for improving its effectiveness. Data from the system may also be used to protect them from adverse public criticisms and legal entanglements. Most of all, the outcomes from an effective system can increase their confidence in the decision-making process and enhance their pride in the worthwhileness of their work.

Similar advantages are gained by the workers actively involved in the system operations. However, they also benefit by gaining an increased awareness of their personal role and contributions in preventing and controlling accidents in the sports activities for which they are responsible. They also, especially through reporting experiences, gain additional knowledge and expertise of the many intricacies of the sport involved and the physical, mental and emotional capabilities of the participants whom they supervise or teach.

Others for whom an effective system is significant are the parents or guardians of participants. Their primary interest in the system doubtless would be the preventive aspects which could eliminate the "unreasonable" risks involved in the sports activity in which their family members participate. However, when an injury does occur, parents or guardians are also benefited by the outcomes of a system which minimizes the severity of damage and extent of recovery. A culminating benefit to parents and family of the advantages mentioned are the elimination or reduction of mental and emotional suffering and the financial burden associated with accident experiences.

The participants, of course, are the persons most directly involved with the benefits of an accident data system. A majority of them are not keenly aware of the injury risks involved. They lack precise knowledge of the critical safety hazards in performing sports activities. They tend to believe that an accident can't happen to them. They make a gross assumption that their sponsoring agency and its supervisory or instructional personnel will automatically assure that all hazards are eliminated or reasonably controlled. They deserve the best protection possible.

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